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AVIATION AND COSMONAUTICS

No. 9, September 1985

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22 January 1986

USSR REPORT MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

No. 9, September 1985

Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow.

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AF POLITICAL CHIEF URGES BETTER PARTY GUIDANCE

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 9, Sep 85 (signed to press 2 Aug 85) pp 1-3

[Article by Col Gen Avn L. Batekhin, military council member, chief of Air Forces Political Directorate: "Higher Level of Party Leadership"]

[Text] The summer period of training in the Soviet Armed Forces, which should constitute an important stage in improving the combat proficiency of our forces, is approaching and end. Air Forces personnel are carrying out training schedules and curricula with enormous patriotic enthusiasm, evoked by nationwide preparations for the 27th CPSU Congress.

Communists and all Air Forces personnel are greeting with strong approval the draft of the new revised CPSU Program.

Just as all Soviet citizens, military aviation personnel unanimously approve of and support the party's policy, aimed at further strengthening our country's economic and defense might, at increasingly fuller satisfaction of the material and cultural needs of the working people, the party's firm, peace-seeking foreign policy, and are proud of the great achievements of the builders of communism.

The decisions of the April and June (1985) CPSU Central Committee plenums, which specified principal directional thrusts in work activities and which precisely defined a line of policy aimed at improving organization and order, give special resonance to all the activities of military aviation collectives, commanders, political agencies, headquarters staffs and party organizations. Productive labor, unity of word and deed, initiative, responsibility, and demandingness on oneself and one's comrades should become the slogans of the moment and the leitmotiv of all work.

The pace and depth of the planned reforms will be fully and entirely determined by the level of party leadership. Therefore the CPSU Central Committee is focusing all party agencies on looking for more effective approaches to it, which are in conformity with the spirit of the time. Such a constructive party pregress line is in conformity with the Leninist rule that one consider a period under review as a step from which we are to stride forward, as a foundation for correcting still existing shortcomings.

In response to aggravation of the danger of war through the fault of aggressive imperialist circles, the combat potential of the Air Forces, including its spiritual components, has been and is being improved. The personnel of aviation units and subunits are successfully mastering modern aircraft, are shortening the time required to ready them for combat operations, and are boosting their level of professional expertise. The quality of training of aviation cadres has improved at Air Forces higher educational institutions, especially pilot schools. Aircraft repair and overhaul enterprises have made a large stride forward in their development. The internationalist functions of our country's Air Forces have grown.

Air Forces political agencies have an important role to play in accomplishing all these tasks. They have amassed considerable work experience in the period since the 26th CPSU Congress. Its scale is substantial. They are determined by the spirit of the time, by constant concern by the party for development of the Air Forces, and by the requirements of the appropriate Central Committee decrees, including the decree "On Work by the Central Committee of the Moldavian Communist Party on Improving the Style and Methods of Activities of Party Organizations in Light of the Decisions of the November (1982) CPSU Central Committee."

The content of the activities of many political agencies is close to the practical tasks of making troops combat-ready to the highest degree. Political agency work methods corresponding to new operational-tactical views have been worked on in the course of military exercises. Considerable attention has been devoted to examining the specific features of leadership of party organizations in given conditions and the problems of reorganizing people's consciousness in the present-day conditions. Improvements have been made in the practical business of disseminating the combat training experience of aviation personnel serving in the limited Soviet forces in the Democratic Republic of Afghanistan.

In the spirit of the demands of the 26th CPSU Congress and subsequent Central Committee plenums, as well as the recommendations of the Main Political Directorate of the Soviet Army and Navy, our political agencies have broadened the organizational capabilities of their influence on the course of affairs by improving party organizational development. The primary level of party leadership has become considerably strengthened. The number of detachments, flights, and command posts with fit and efficient party organizations has increased by 15 percent.

The activities of many political agencies have begun to be distinguished by an increased focus on practical matters and the ability to stimulate performance improvement. Such a situation is characteristic in particular of the political sections in which party members V. Pisarenko, I. Konstantinov and others work. The experience amassed by these collectives in the course of implementing the demands of the 26th CPSU Congress and subsequent CPSU Central Committee decrees requires thorough study and dissemination.

At the same time, the profoundly constructive demands of the April (1985) Central Committee Plenum on preparing to greet the 27th CPSU Congress in a

worthy manner focus Air Forces political agencies chiefly on a critical analysis of their activities, including in matters pertaining to party guidance.

As we know, unceasing development of the style and methods of activities of party agencies is a logical pattern of party leadership. Unfortunately, however, it is not being observed in a number of places. A recent performance evaluation indicated, for example, that the approach by some political workers toward accomplishing tasks has not undergone appreciable changes in the spirit of such CPSU tactical guidelines as focusing on the job at hand, closeness to people, realisticness in situation appraisal, increasing demandingness, and elimination of duplication and attention to form with consequent detriment to content. In a number of collectives the CPSU Central Committee decree on the performance of the Moldavian Communist Party failed to serve as an additional impetus in improving the practices and style of party leadership.

These shortcomings are most noticeable in the process of mastering new aircraft. On the whole a great deal of attention is devoted to this work. For example, the political section in which officer V. Kuzmitskiy serves approached this issue with a great deal of responsibility, thoroughly studied the state of affairs in the unit, investigated the performance of commanders, political workers, and the party organization, strictly monitored aviation personnel progress in mastering the new equipment, and gave essential help when needed. As a result the collective successfully accomplished the assigned task.

A different picture was observed in the political section in which officer Yu. Kolpakov works. Here they were unable to eliminate inertia and conservatism in methods of party influence on all aspects of the collective's life and activities and failed fully to realize that rapid, high-quality mastery of all aircraft equipment is one of the measures taken by the party and government in response to the aggressive aims of imperialism. It is also for this reason that transition training to the new aircraft is not proceeding as well as it could.

Two different collectives, two different approaches to accomplishing the same task. The situation was not properly assessed, however, by the higher-echelon political agency. Unfortunately these are not isolated cases, and we cannot accept such a situation. We must study the nature of these discrepancies in a serious manner, do a better job of propagandizing the substance of advanced know-how, bring aviation personnel in a purposeful manner to perceive it innovatively, and to motivate leader personnel to reorganize those components of the administrative edifice which impede adoption of the new.

In some political agencies there is as yet no clear understanding of urgently needed changes in their work methods in connection with the need to boost the "human factor" up to the level of the new equipment. Not everybody as yet sees in this an immediate reserve potential for acceleration. Sometimes, with an abundance of vague experiments, plans and instructions, units fail to receive from political agencies specific recommendations on such root and in many ways new problems as differentiation of the process of preparing a pilot for flight operations, increasing process discipline and applied mathematical

training, moral incentive for striving for high accuracy of weapons employment, reworking of psychophysiological conditioning and military-technical propaganda. We must also note such a negative fact as the inadequate competence of some leader-Communists, including political workers, in matters pertaining to the specific features of new equipment. One of the reasons for this is a lessening of party demandingness on the quality of commander training, independent work, and observance of the following fundamental principle: the immediate superior teaches his subordinate. This situation must be corrected in all areas and at all echelons. Political agencies have a particularly great deal to do in order to show all our cadres, headquarters staffs, party and Komsomol organizations an example of innovative, constructive reorganization of work methods in a spirit of today's demands.

The essence of party leadership and the basic function of the political agency consists in implementing the party line and in ensuring that the practical work of each Communist is in conformity with party military policy. In connection with this we must note that political agencies should increase their influence on organization of implementation of CPSU Central Committee decrees pertaining to matters of oversight, discipline, and work with cadres. As a rule a weakening of the organizing role of political agencies in carrying out the demands of party guideline documents leads to an artificial narrowing of the sphere of party leadership on their part. Sometimes the main, so to say "production" affairs of Communists and party organizations are omitted from it.

This was the case at one time at the Borisoglebsk and Syzran higher military aviation schools for pilots. The party organizations of these schools' departments, faculties, and flight training sections took little guidance in their practical activities from the CPSU Central Committee and USSR Council of Ministers decree entitled "On Further Development of the Higher School and Improving Quality of Training Specialists." As a result flying methods, scientific research, and training-didactic aspects were not given proper party influence, which could not help but affect the quality of cadet training. The situation has now been rectified, but political agencies are still obligated to continue in the future rigorously monitoring implementation of the requirements of party guideline documents.

In addition to the above shortcoming, one also frequently encounters another -- an insufficiently firm approach to such a matter as combating deviations by individual Communists from the party-specified line. Excessive situation simplification is the most intolerable of all deviations. It is sometimes manifested in the attempt to evaluate a unit or subunit not according to its ability to perform the assigned mission but rather according to intermediate criteria (for example, on the basis of flying hours logged, average mark earned, etc), not according to the ability to perform all its characteristic combat missions but only one, arbitrarily selected mission. This always results in failure to stand up to a more objective performance evaluation. False performance figures constitute such unwarranted situation simplification in production. An unrelenting campaign is being waged in all work collectives to combat this pernicious phenomenon. Its consequences in the military are very substantial, since they affect the interests of national defense. For

this reason the position taken by political agencies and party organizations should be implacable: guilty parties should not be let off easy, and higher demands should be placed on specific individuals. This is precisely how our party states the matter.

Political agencies have a special function. Working together with commanders, they are called upon to marshal the spiritual and intellectual reserve potential of personnel in a timely manner, as well as their initiative and will to win. A good deal of positive experience in this regard has been amassed in the collectives in which party members A. Shershnev and V. Minin work. In the political section and party committees they analyze the contribution made by each party organization and by each party member in performing the tasks assigned to the collective. Attention is focused on matters pertaining to activeness and exemplariness of party members in combat and political training, in meeting socialist pledges, and in the campaign to strengthen discipline and organization. On the basis of achieved success and acquired experience and know-how, aviation personnel have made upgraded socialist pledges in honor of the 27th CPSU Congress.

We should note, however, that this is not the situation everywhere. The activities of certain political agencies do not yet show a clear-cut system in their work, aimed at developing initiative and innovativeness in personnel. Here and there there has been a loss of aggressiveness to dissemination of advanced know-how, and excessive attention to form has not been eradicated in socialist competition. Why does this happen? Because some political sections go for long periods of time without addressing specific useful suggestions, fail to monitor their practical adoption, have poor knowledge of those persons who display the greatest initiative and thought, do a poor job of supporting them, and rarely meet with them locally. Some political workers are unable to focus people's productive innovativeness and initiative in the main direction, as well as when this is particularly essential. And some simply lack affection for a vital activity. As a result one encounters situations where socialist competition slackens for the above-listed reasons in many collectives at the most critical phases of the process of mastering new equipment, and efficiency innovation work dies down, as does the search for optimal combat models and new techniques of aircraft servicing and maintenance.

A single conclusion suggests itself: political agencies and party organizations must have a highly serious attitude toward the guidelines of the April (1985) Central Committee Plenum to the effect that one can accomplish the difficult, important tasks of the present stage only by relying on the lively innovativeness of the masses, on our people's intellect, talent, and labor. As is attested by the experience of vanguard performers, precisely this resolution of the matter produces the best results.

In the time which has passed since the 26th CPSU Congress, the practical activities of the overwhelming majority of political agencies have by and large been in conformity with the party's present demands pertaining to one of the most important evaluation criteria -- results. But there also remain some unresolved problems. Military discipline, for example, continues to be a weak point. There are many units and subunits in the Air Forces in which there

have been no air mishaps or near-mishap situations through the fault of personnel for a long period of time. Many collectives have almost totally eliminated violations of military discipline and departures from communist ethical standards. In the course of mastering new equipment and aircraft combat employment, their personnel as a rule demonstrate a high degree of efficiency and precision, and produce excellent results. In some units, however, the number of air and ground mishaps is not diminishing, and things are not progressing beyond statements of assurance.

Practical experience indicates that it is necessary to change and improve one's approach to collectives which are lagging in discipline. In each specific instance the political agency must make a thorough examination to determine when and how problems occurred, through whose fault, to present a public assessment of the situation and to mete out strict punishment of the guilty parties. One should not merely designate work to be done in collectives lagging in discipline but should genuinely bring order to the situation, considering not quantity of measures performed but a genuine improvement in the situation to be a positive result.

The April (1985) CPSU Central Committee Plenum forthrightly pointed out that one must place stricter demands on leader personnel responsible for discipline. We do this, but unfortunately it is not being done correctly everywhere. Sometimes guilty parties are made to answer only after a bad situation has occurred. But one should be taken to task for errors of omission in one's work before they lead to a deplorable result. Precisely this profoundly party-minded method produces a positive effect.

In connection with this we must emphasize that work with and guidance of personnel presupposes the ability to exercise influence on people's consciousness and feelings, the ability to persuade and lead. To concentrate on this matter, as V. I. Lenin stated, "party awareness, party interest, and party attention" means ensuring success. Herein lies a distinctive feature of party leadership. Ideological indoctrination work constitutes a most important method and effective means of party leadership. While giving an overall positive assessment of efforts by political agencies to improve ideological and mass-political activity, we nevertheless cannot rest on our laurels and simply accept shortcomings. Interest in and acuteness of attitude toward moral and ethical problems are increasing today in all strata of our society, including the Armed Forces. The CPSU Central Committee decree entitled "On Measures to Overcome Drunkenness and Alcoholism" has evoked total approval, for example. Air Forces political agencies as well must become involved in this issue, which is the business of the entire party and the entire people. There is no doubt that this will be reflected in further improvement of ideological and mass-political work. The path to this was pointed out in the conclusions of the April (1985) Central Committee Plenum, one of which, in particular, was formulated as follows: less talk and more action.

It is precisely the frame of mind toward innovative, important, difficult things which determines today the activities of all command and control agencies, party organizations, and all collectives. This important task evokes the need not only for improvement but also profound changes in party

work. "This work," stressed CPSU Central Committee General Secretary Comrade M. S. Gorbachev in a report at a party Central Committee conference on problems of scientific and technological advance, "deals with a decisive factor in all changes -- the human factor. Therefore its main guideline today is to accomplish by all means a change in the minds and attitudes of cadres from top to bottom...."

Proceeding from this, it is necessary to ensure first and foremost that the organizational work of each and every political section guarantee reliable implementation of the party's demands. One of the most important of these is improvement of leadership of primary party organizations. Political sections must handle things via party organizations, using their own party methods, without duplicating the activities of commanders and supervisor personnel. And they must endeavor to ensure that the spiritual and intellectual aspects of things as well as their ethical components are at the center of attention. More work should be done with the body of activists, especially those elected this year for the first time, and a better job should be done to teach secretaries of party committees and buros party work, in particular in the course of mastering new equipment and in the dynamics of flight operations.

Influence of party agencies on work with supervisor personnel needs considerable strengthening and new approaches. The April (1985) CPSU Central Committee Plenum stressed with renewed emphasis the necessity of most strictly observing Leninist principles of personnel selection, placement, and indoctrination. First of all it is necessary to enhance the role of moral-political criteria in evaluating cadres. Certification and placement should be conducted taking into account those demands on leader personnel which the party today is advancing to the forefront. It is essential in party recommendations and performance assessment materials to evaluate people's businesslike efficiency, sense of the new, initiative, boldness, readiness and willingness to assume responsibility, the ability to complete a job once begun, the capability to give a class directional thrust to indoctrination work, and correctly to foresee the socioethical consequences of decisions. Only this approach to things produces positive results.

The quality and effectiveness of party leadership of political agencies will substantially improve if we increase the efficiency of style of organizer activities, radically strengthen verification of execution of instructions and decisions, and learn correctly to distribute attention, to foresee and intelligently to plan one's work. Alongside traditional methods of party leadership, political agencies must work more boldly to master new achievements in general party methodology and resolutely to reject all that which takes time and energy but fails to produce effect.

Our political agencies must accomplish all these tasks, which proceed from the party's demands, right today, right now, without slipup or delays. The report-election campaign which has commenced in Air Forces party organizations also requires this. One should display maximum concern to ensure that meetings of primary organizations be conducted in a businesslike manner, in an atmosphere of criticism and self-criticism, that they reflect the pressing issues in the life of the collective and ways to eliminate everything which hinders their work and progress.

The patriotic movement to greet the 27th CPSU Congress in a worthy manner is broadening day by day in Air Forces units and subunits. It is the duty of our political agencies to guide this high degree of political and job-related activeness on the part of military aviation personnel for successful accomplishment of tasks, ensuring further increase in the combat power of the Air Forces.

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AIRCROWS TRANSITION-TRAIN ONTO NEW AIRCRAFT

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 9, Sep 85 (signed to press 2 Aug 85) pp 6-7

[Article, published under the heading "Be Alert, In a Continuous State of Combat Readiness," by Military Navigator 1st Class Col A. Yudenko: "Taking Flight Psychology Into Account"]

[Text] On that flight operations shift I had occasion to take part in graded training missions with aircrews to test their readiness for combat. The training missions were flown along a route at extremely low level, with paratroopers being dropped onto unfamiliar terrain. The complex tactical environment, possible weather deterioration (development of towering cumulus was expected in the drop-zone area), as well as a strong crosswind during landing made it possible thoroughly to test the proficiency of flight personnel.

All three aircrews prepared for the performance-testing flight at the same time, but differently. This is attested by the fact that the quality of preliminary training sorties, graded by the instructors with an average mark on navigation and drop-zone delivery, differed. The average mark for navigation was 4.75 for Maj A. Oborin's crew, for example, and 4.42 for drop-zone delivery, while the marks received by the crews of Capt K. Savelov and N. Zatsepin were somewhat lower. There were instances of unsatisfactory performance on drop-zone delivery, while Capt N. Zatsepin's crew was in addition assigned additional training sorties to practice the most complicated aiming techniques.

Receiving approval to fly paratrooper delivery with aiming procedures and displaying thereby excellent mastery of the weapons aiming and navigation system, Major Oborin's crew was among the first to be authorized to fly the performance-testing training sortie. It became clear from the very moment of takeoff that the crew members were well prepared and that each specialist was rigorously observing the requirements of the appropriate manuals and regulations. Navigator Sr Lt I. Shishkin did a particularly precise job of working with the PNPk [aiming-navigation system (flight director computer)].

While en route, I introduced a scenario instruction stating malfunction of the principal aiming device. Although this was a rather tough problem, it failed

to rattle the crew. The navigator immediately reported changeover to the backup aiming device and calculated the requisite data. The aircraft commander checked the correctness of these calculations and reported to the jumpmaster in back on the aiming equipment changeover. Maneuvers to penetrate hostile antiaircraft defense and to bypass zones of "radioactive contamination" of air mass were executed with equal precision.

Having executed at the specified points the required operations with the aiming and drop-zone delivery gear, the crew dropped the paratroopers precisely on schedule. After this the flight operations officer introduced a scenario instruction stating failure of the aircraft's localizer and glideslope receivers.

"Crew, we are going to fly an ADF approach in flight-director mode. Navigator, monitor with PNPk," calmly instructed Major Oborin.

With low cloud cover and limited visibility, the pilot precisely executed his approach configuration maneuver and placed the heavy aircraft precisely on the numbers.

This aircrew's smooth performance left a good impression. It is probably for this reason that I was in an elevated mood as I departed on a training mission with Capt K. Savelov's crew. But the aviators' first actions pertaining to airspace surveillance with the airborne radar caused me to prick up my ears. A cumulus buildup was commencing, and it was necessary to keep an eye on the weather situation with the airborne radar. The aircraft commander's concerned voice was constantly coming over the intercom: "Navigator, what kind of echoes are you getting?"

This intrusive questioning naturally diverted the navigator away from the PNPk. He had to remind Captain Savelov that he too had the capability to scan airspace with the airborne forward-looking radar.

Spotting radar returns indicating thunderstorm cells close to their flight path, the crew members were nervous, and their actions to fly around these storm cells lacked confidence. The navigator, Capt S. Pavlov, improperly operated the PNPk, as a result of which it went off-line. In other words, the navigator himself created a problem situation.

In the process of maneuvering to avoid the storm cells and to get the PNPk back on-line, the crew neglected such an important element of navigation as arriving over the target on schedule. The crew failed to note that they were hitting enroute waypoints late. And although it was obvious that maintaining the previous flight parameters would result in reaching the target late, none of the crew members reacted to this. It became necessary to intervene and order increased speed. It had become obvious that introducing further complications into the flight was out of the question, since there was no clear-cut coordination and mutual understanding between crew members. The aircraft commander, relying entirely on the navigator, every so often would peer into the radar hood and reply mechanically to progress reports: "Roger." But he failed to check the correctness of his actions and calculations,

offering no help whatsoever. His copilot acted equally passively. Therefore this flight did not make the best impression on me.

What about the third crew? Aware of weak points in Captain Zatsepin's crew from what I had been told by navigator-instructor L. Rudkin, during the period of preliminary preparation I examined in detail all specific features of the forthcoming training mission. I devoted particular attention to flight personnel response on failure of aiming-navigation equipment, and to utilization of backup navigation and aiming gear. The navigator, Sr Lt N. Sobolevskiy, replied fairly confidently to all questions. And I believed he would perform just as confidently in the air.

And at first this is the way things went. With a properly operating system, the crew performed according to the book. All elements of the navigation plan were executed promptly and correctly. In response to scenario instructions stating failure of the navigation equipment, Senior Lieutenant Sobolevskiy's actions were correct on the whole, but they were performed uncertainly and slowly. After each operation, the navigator would look at me questioningly, as if waiting for confirmation that what he had done was correct. One had the impression that he was responding to such scenario instructions for the first time.

At a certain point during the flight, a new scenario instruction was radioed to the aircraft: total failure of the airborne look-down radar and the PNPk main reckoning corrector. It immediately became apparent that Senior Lieutenant Sobolevskiy was not prepared for such a turn of events. Reporting the equipment failure to the aircraft commander with alarm in his voice, he turned to me and asked: "Will the drop be aborted?"

I in turn queried the aircraft commander: "What is your decision?"

In this situation Capt N. Zatsepin did not hurry his reply. After consulting with the navigator, he reported: "We shall use the backup navigation and aiming gear."

The decision was a correct one, for the crew of this aircraft had at their disposal, in addition to the look-down radar as principal means of correction, a rangefinding system and a goniometric-rangefinding system, which provide capability to correct the PNPk reckoning with the required degree of accuracy. In addition, the forward-scanning radar could be used to bring the aircraft onto the drop initiation point. All that is necessary is to select the required operating mode and determine the appropriate conditions for using these systems.

Could it be that the navigator did not know this? It was ascertained that he did. During preliminary mission preparations, the crew reviewed the principal variations of utilizing the navigation and aiming equipment. Primary and backup means of navigation and aiming were specified for each phase of the flight, and the procedure and sequence of actions by crew members in case of occurrence of malfunctions was established.

Why is it that the navigator became confused after such thorough preparations? Apparently during training check flights the officer did not actually rehearse this scenario variation a single time. They simply assumed they knew how to proceed on failure of aiming and navigation equipment. His first navigator-instructor, Capt S. Savin, believed that if a trainee correctly answers from the standpoint of theory questions connected with failure of aiming-navigation equipment, he will correctly handle such a problem during a training mission. Proceeding from this assumption, on check flights he limited himself to simulating failure of certain navigation systems. A consequence of this complacency was psychological unpreparedness by the navigator to respond to aiming-navigation equipment failure.

Seeing the confusion on the part of Senior Lieutenant Sobolevskiy, I explained to him that the paratrooper drop could be successfully accomplished in the given situation. Reminding him of the sequence of subsequent procedures with the aiming-navigation equipment and going through initial procedures with him, I sensed that the officer had become more confident. He continued his work with greater calm. Purposefulness was evident in his actions. Using the rangefinding and goniometric-rangefinding systems to correct coordinates in the PNPk, verifying with the forward-scanning radar, he precisely accomplished the paratrooper drop in a difficult situation. It was not necessary to intervene in his actions. The concluding portion of the flight was accomplished smoothly and calmly.

Thus the three crews flew graded training sorties to test their readiness for combat in a new aircraft for them. And although all flights received affirmative marks on navigation, combat employment, and flying performance, at the post-mission analysis session with supervisor and instructor personnel it was necessary to point out a number of shortcomings in the crews' job-related and psychological preparation. They consisted chiefly in the fact that flight personnel lacked firm confidence in successful accomplishment of the flight, especially in difficult conditions. This shortcoming was manifested with particular obviousness in the performance of Captain Zatsepin's men.

Analysis of the flights indicated that first and foremost weak methods and pedagogic training on the part of the instructors is the principal reason for the noted deficiencies. Devoting their main attention to accomplishment of the flight training curriculum, they neglected the psychological preparation of crew members and failed to develop in them confidence when operating in difficult conditions, and yet it is no secret that this is very important for young aviation personnel transitioning over to a new aircraft.

Take, for example, officer N. Sobolevskiy. Poor psychological preparation led to a situation where on the eve of the performance-testing training mission he began to entertain doubts about successfully accomplishing the task as well as about his own abilities, accepted failures, and did not attempt to get himself into a mood to accept the challenge. It is not surprising that the process of transitioning to a new aircraft, which usually generates eagerness and enthusiasm on the part of crew members, became for him a depressing, joyless affair.

Of course nobody is guaranteed against failures. Any crew member, even the most experienced, can make a mistake and may not immediately master some complicated component of a mission. But if he possesses sufficient psychological stability and in addition has an experienced methods specialist-instructor who is capable of thoroughly analyzing an error, finding its cause and specifying ways to correct it, results will not be long in coming. Therefore one should not fear errors on the part of crews transitioning to a new aircraft, especially young crew members. At first errors will occur. It is another thing altogether -- how can one learn to overcome them, and how should the instructor handle the situation if a trainee makes many mistakes? It seems to me that first of all he should not reach hasty conclusions and should not indicate to the trainee displeasure with the latter's actions. The aircrew member should see that the instructor considers his lack of success to be a temporary, entirely surmountable phenomenon. If the young air warrior believes in himself, he will definitely show the desire to achieve stable success and will make every effort to attain the designated performance level.

Flying labor, just as any other work, should bring a person joy. This can be achieved if each and every training flight connected with mastering new equipment will involve new knowledge. In other words, each and every training flight with an instructor should be for the trainee a distinctive step upward toward the summit of flying skill. This is why it is necessary to make every effort to avoid marking time, since this will bring nothing but disappointment.

Mastery of new equipment by flight personnel, just as independent study, is a creative process, which requires application of all knowledge, experience, and purposefulness, both on the part of aircraft-transitioning personnel and instructors. This determines the quality of aircrew flying proficiency, the effectiveness of their performance in the air, precision and efficiency in performing combat missions in any and all air and tactical environment conditions.

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ALERT FIGHTER PERSONNEL READY-ROOM ACTIVITIES

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 9, Sep 85 (signed to press 2 Aug 85) pp 8-9

[Article, published under the heading "Anticipating the 27th CPSU Congress," by Capt A. Voynov: "High Degree of Vigilance on Alert Duty"]

[Text] There is a small concrete pad area by the ready room. The solemn ritual of aircrews reporting for alert duty takes place here. One's attention is drawn by a display board bearing a schematic representation of a map of the USSR. Alongside stand models of the Kremlin wall and a border marker post. "Fighting man, you are defending the skies of the homeland!" an inscription on the display states a reminder. And these words, simple but filled with enormous meaning and content, reach right to one's heart, forcing it to beat faster from the awareness of one's great responsibility for guarding the peaceful labor of Soviet citizens.

A bust of V. I. Lenin stands on a low pedestal in the center of the concrete area. Glancing at it, one involuntarily recalls a statement by our leader: As long as imperialism continues to exist, the threat of war will not disappear. This statement calls for vigilance and recalls numerous historical facts dealing with the aggressive nature of imperialism, the fact that things are far from tranquil in the world today, and therefore we must keep our powder dry. These words contain quite specific meaning for the men of the squadron commanded by Maj V. Chernov, deputy commander for political affairs Maj Yu. Boyko, for the combat aircrews take turns standing alert duty.

Every day the words of alert-duty orders and the solemn melody of the Anthem of the Union of Soviet Socialist Republics ring out in this ceremonial area. Each day the national flag of the USSR is hoisted up the flagpole.

Today Military Pilot 1st Class Capt A. Reznichenko has the honor of raising the flag. He has stood alert duty many times. During these moments he, just as everybody who has stood stiffly at attention, was feeling with renewed acuteness the emotion and pride evoked by the enormous trust which the homeland places in its winged warriors, the great responsibility which from this moment rests on the shoulders of each and every member of a combat aircrew.

The ceremony over, the men proceeded with performance of their duties. Following their schedule, Military Pilot 1st Class Capt P. Novikov, party group organizer for the alert-duty personnel, Komsomol group organizer excellent-rated aircraft technician Lt O. Tolmachev, agitator aircraft technician Lt A. Shustrov, and news bulletin leaflet editor aircraft mechanic Pvt B. Tozhiyev went to work. During the alert-duty shift they will be using diversified work forms and methods to provide the alert duty operation with ideological support.

This is not a new task for them. In this squadron considerable attention is devoted to organization of party-political work during alert duty. The squadron's successful performance is due in large measure to this. Selection and placement of alert-duty crew activists, detailed briefing, performance monitoring of and assistance to activists, and subsequent analysis of their performance determine a high level and effectiveness of all party-political work.

This time as well, Capt Yu. Boyko gathered the activists together for a briefing on the eve of going on alert duty. The officer specifically stated the tasks of the party group organizer, the Komsomol group organizer, the agitator and news bulletin leaflet editor. In conclusion he stated to the activists: "Through collective efforts, by working smoothly, in coordination, and utilizing all forms of influencing personnel, it is our duty to maintain in the men high morale and a strong political attitude, to heighten their feeling of responsibility for defending the homeland's airspace, and to strengthen discipline and organization during performance of this alert-duty mission."

The briefing session was also attended by squadron party buro member Senior Pilot Capt A. Reznichenko. He was instructed to analyze the work performance of the body of activists and to report his observations and conclusions at a meeting of the party buro.

The alert-duty activists have all necessary conditions for successful accomplishment of political indoctrination work. The Lenin Room is at their disposal. The main emphasis in setting up this room has been placed on instilling a high degree of vigilance in the men and maintaining constant combat readiness. An important place in visual agitation is occupied by materials exposing the aggressive nature of imperialism and revealing its military preparations.

One can find in the Lenin Room the complete works of V. I. Lenin, a selection of political literature, and files containing central newspapers. There is a file containing materials to assist the agitator, which are regularly updated, and there are instruction leaflets for activists on working with personnel. There is a display stand with photographs of vanguard alert-duty performers. They include photographs of Military Pilot 1st Class Capt A. Reznichenko and excellent-rated-aircraft technician Lt O. Tolmachev.

Alert-duty shift party group organizer Capt P. Novikov, gathering the men in the Lenin Room in front of the vanguard performer display, emphasized that today's alert-duty personnel include individuals whose professional expertise,

high degree of vigilance and personal exemplariness in performing a combat task have been presented as an example to their colleagues. He then gave the floor to Captain Reznichenko and Lieutenant Tolmachev, who shared their experience and know-how with their comrades and answered their questions.

The discussion was continued by Lt A. Shustrov. The agitator briefed the men on materials published in the press dealing with competition among civilian workforces and military collectives to greet the 27th CPSU Congress in a worthy manner and commented on recent events in the USSR and abroad. He discussed in detail information attesting to the aggressive aspirations of imperialism and military maneuvers by the armies of the countries of the NATO bloc. In conclusion the officer called upon his colleagues to improve their professional skills, to carry out their assigned tasks in an exemplary manner, and to endeavor to surpass performance standards in equipment operation and servicing.

The talk ended. Aviation personnel proceeded to another room -- a unique aerodynamics, tactics, and weapons training classroom. Display stands and posters showed the offensive weaponry of the potential adversary, with methods recommendations on conduct of combat in various conditions, plus a great deal else which the pilot must know in order to defeat a powerful and crafty opponent.

Senior Lieutenant Captain Reznichenko knows almost by heart the content of the materials on all display stands. Nevertheless he read the familiar lines over and over. Noticing this, Captain Novikov challenged him to a contest on knowledge of the combat capabilities of the potential adversary's offensive weaponry and tactics. Reznichenko accepted the challenge. The officers determined the range of questions for self-testing, the time allowable for answers and, each taking a sheet of paper, set to work.

Captain Reznichenko was the first to finish, followed by Captain Novikov. All answers by both officers were correct. But Reznichenko had finished the test ahead of his opponent and had given more detailed answers. He was declared the winner. Both pilots commented favorably about this kind of test and resolved to use it in the future to improve their own personal job proficiency.

Here too Reznichenko shared his concerns with the party group organizer. Testing the level of theoretical training of the junior aviation specialists, he became convinced that all of them were well familiar with their job duties and procedures in a normal situation, but as soon as conditions were made more complicated and scenario instructions introduced, some of the young mechanics displayed diminished aggressiveness in performing combat training tasks.

The officers discussed this matter with the Komsomol group organizer, Lt O. Tolmachev. After talking it over, the activists decided to hold a competition with the junior aviation specialists for best knowledge of rules and procedures of readying aircraft equipment in a combat environment. They devised theoretical questions and scenario instructions, and they set up two teams -- two technical crews.

One of the scenario instructions faced Jr Sgt M. Gadzhimuradov with a difficult problem. But he quickly gained his bearings and, skillfully organizing the technical crew's work, "accomplished" sortie turnaround for a "disabled" aircraft technician. The other technical crew also performed well.

The contest was both competitive and interesting. The participants felt a full measure of personal responsibility for prompt and high-quality aircraft combat sortie turnaround in a difficult environment and became convinced that accomplishment of the combat mission depended in large measure on their skill, initiative, persistence, and ingenuity.

Officer A. Shustrov and Komsomol member Pvt V. Tozhiyev put out a news bulletin leaflet based on the contest results, naming the aviation specialist winners. They included O. Belinskiy, Ye. Ukhanov and M. Gadzhimuradov. The activists called upon all the men to measure their performance against the front runners.

On that day the alert-duty activists endeavored to diversify ideological work forms and methods. The core of this work consisted in instilling in the men political vigilance, a strong sense of responsibility for the assigned task, and psychological readiness to perform with precision in conditions approximating actual combat. And we must say that this work achieved its goal.

...Fighters stood poised near the ready room, standing ready to take to the air immediately, at the first command. The scarlet banner was snapping in the fresh breeze. Those men who raised the flag as they commenced alert duty are ready at any moment to carry out the homeland's orders, to defend its airspace with their very life's blood.

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IMPROVING WORK STATION EFFICIENCY AT AIRCRAFT OVERHAUL ENTERPRISES

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 9, Sep 85 (signed to press 2 Aug 85) p 22

[Article, published under the heading "Recommendations of Science Into Practice," by D. Yermakov, aircraft overhaul enterprise scientific organization of labor laboratory chief: "On the Basis of Brigade Diagrams"]

[Text] As we know, the Communist Party of the Soviet Union, defining tasks for the 11th Five-Year Plan, specified the brigade form as the principal form of organization of labor at production enterprises. Subsequently, in the process of resolving important economic problems of the current five-year plan, it specified the future paths of development and improvement of the brigade method of labor, noting some lag in brigade adoption of economic accountability and labor remuneration according to end results.

Now, at the threshold of the 27th CPSU Congress, clearly defined, scientifically substantiated organization of labor at every work station is essential in order to increase the efficiency of the brigade method. We are convinced that this can be achieved with the aid of a brigade organization of labor diagram, which also reflects elements of economic accountability.

Just what is a brigade organization of labor diagram? First of all it is a concentrated statement of a given proposed technology, grounded on preliminary engineering, economic, psychophysiological, public health, and other studies. The proposal recommends the most progressive labor techniques and methods. rational arrangement of brigade member work stations, a system of controlled and regulated servicing of work stations, and the creation of favorable, scientifically substantiated work and leisure regimen. The brigade diagram is a component of standard organization of labor plans for the production section, shop, and enterprise, and constitutes an essential normative document in certification of work stations in industry and at aircraft overhaul enterprises of the USSR Ministry of Defense.

In particular, the enterprise directed by officer V. Mironov has already amassed some positive experience in drawing up and adopting brigade diagrams in conformity with the requirements of the corresponding decree of the USSR Council of Ministers and All-Union Central Trade Union Council. These requirements include brigade operation on a cost-accountability basis and

labor remuneration based on end results, with employment of a labor participation factor (KTU). Thus the brigade diagram brings the possibility of type-classifying and standardizing many solutions pertaining to organization of labor.

For the sake of illustration we shall examine the points and characteristics of some organization of labor solutions incorporated in the brigade diagram. Its first section is called "Input Data" and includes a refined advanced process, utilization of which will be accompanied by an increase in labor productivity and improvement in product quality. In view of the fact that primarily combined brigades are operating at the enterprise, workers assume not only individual but also brigade socialist pledges. I believe that these forms of competition will motivate each brigade member to work more productively and will provide incentive to achieve excellent end results.

The forms of organization of labor and system of labor remuneration can be the most diversified: hourly wage plus bonus, piece-rate plus bonus, and others. But distribution of collective earnings among the brigade members is done on the basis of actual time worked and certified skill category, while distribution of bonus and extra earnings is done on the basis of KTU, which in most cases should not be equal to 1, for otherwise it will not perform a labor incentive function.

The next section recommends that the labor process be organized in the form of a contract between the brigade and the shop management. Brigade pledges to meet the production target with all technical-economic indices should be provided by the shop management at those times specified in the contract. This form of relations between production brigade and shop management helps achieve a smooth production rhythm, increased labor productivity, improved quality and reliability of overhauled aircraft equipment, and is in conformity with the provisions of the economic experiment being carried out in industry.

The next section of the diagram reflects a new kind of work station servicing, replacing scheduled preventive servicing, so-called regulated servicing. It consists essentially in the fact that the principal workers are freed from self-servicing, thus eliminating losses of work time. In other words, auxiliary workers deliver from the storeroom to the work station everything required for performing scheduled operations. And this is done in a centralized manner with a governing schedule, at a specific time, at a designated location, and on a specified timetable. An auxiliary shop has been established at the enterprise to perform this work. Experience indicates that adoption of a regulated servicing system can produce substantial economic effect.

The labor conditions section enumerates means of protection against adverse environmental factors: temperature drops, high humidity, poor lighting, noise, etc. I believe that every aircraft overhaul enterprise should have its own requirements, determined by the nature of the job performed -- in conformity with the requirements of industrial safety standards.

The final section contains recommendations on efficient utilization of work time, substantiated by appropriate normative documents. Research study should

be continuously conducted, however, in order to ensure that in each specific instance working time is maximal and highly productive.

Adoption of organization of labor diagrams at aircraft overhaul enterprises is a multilevel and comprehensive job, the content of which reflects the present demands of the Communist Party and Soviet Government regarding matters pertaining to improving quality of organization of labor.

I believe that the positive experience amassed at this aircraft overhaul enterprise in drawing up and incorporating brigade diagrams will offer substantial assistance to chiefs of scientific organization of labor laboratories at Air Forces overhaul enterprises in devising measures to achieve further increase in labor productivity and annual savings.

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FLYING A JET TRAINER LANDING APPROACH

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 9, Sep 85 (signed to press 2 Aug 85) pp 28-29

[Article, published under the heading "Practical Aerodynamics for the Pilot," by Candidate of Technical Sciences Docent Col G. Rayevskiy: "How Should the Landing Be?"]

[Text] A training field runway is rarely empty in summer. When pilot cadets are flying, flight operations run from dawn to dusk. The swift pace of flight operations is most apparent to the flight operations officer in the tower and to his assistant at the runway control point, for it is necessary to give prompt and timely assistance to the pilot cadet in correcting any error on glidepath before he is in close proximity to the ground. And appropriate commands go out over the radio.

During pilot cadet training, especially first-year cadets, the greatest number of mistakes occur during final approach and landing. It is therefore not surprising that the most experienced pilots, who have logged a good deal of flying time and have considerable instructor experience, are designated flight operations officer.

As we know, the quality of the landing depends on the quality of the final approach. During the first and second years pilot cadets fly jet trainers with excellent performance characteristics. Their equipment, aircrew working conditions, as well as landing approach configuration approximate those of combat aircraft. What should the approach and landing procedure on a jet trainer be?

According to the pilot's manual, after lowering his flaps to the landing configuration, the pilot must adjust his approach descent airspeed to 220-210 km/h indicated. After turning from base to final, this airspeed shall be maintained by adjusting power setting right to the point of initiating roundout.

Some pilots interpret this point as follows: if one sets constant rpm, at 85 percent, for example, just before turning final, upon approaching the middle compass locator indicated airspeed will be close to the specified figure (Vap=230-220 km/h) and will subsequently remain constant. The manual does not

specify at what point constant airspeed should be established, and consequently descent takes place as prescribed.

Others claim that the aircraft does not maintain an airspeed of 220-210 km/h, fluctuates in airspeed, and that flying even at an airspeed of 230-220 km/h becomes unsafe.

One also encounters the view that the process of mastering a supersonic fighter by a pilot cadet will be smoother if from the very first year he is taught to fly the approach descent at a variable airspeed, as is done with combat aircraft. From the initiation of descent to initiation of roundout airspeed will change from 280 to 220-210 km/h.

Thus we have differing points of view, and therefore differing methods of landing approach descent. Let us examine in greater detail the advantages and drawbacks of approach descent with a constant and variable airspeed, and we shall examine aircraft airspeed stability in landing approach descent conditions.

We shall take as our first example an aircraft approach descent at constant $V_{ap}=220-210$ km/h. What are its characteristics?

An aircraft descends from the outer compass locator to the runway in 65-69 seconds. During this time the pilot cadet extends his flaps, checks to make sure they are extended, trims the aircraft, adjusts his throttle, and establishes his glide angle. During descent he must monitor a good many parameters: altitude, rate of descent, degree of slip, etc. The flow of received information increases. As a result many student pilots keenly feel the pressure of time to make decisions on the approach descent, especially early in their training. Consequently their actions are sometimes hasty and unconsidered. While correcting one error in response to a command from the tower, they make another one. In addition, many student pilots become quite tense as they approach the runway, which results in errors in roundout, float, and touchdown.

It has been established that aircraft descent at constant airspeed somewhat increases flight time from outer compass locator to runway and, in contrast to flight with deceleration, relieves the student pilot from the need to monitor airspeed more frequently, and creates a certain time reserve for correcting errors. At the same time the aircraft responds more sluggishly to the controls, since effectiveness of control surfaces diminishes.

Question: is a landing approach at a constant airspeed of 220-210 km/h configuration II? As we know, for any aircraft setup the boundary between configuration I and II is airspeed V_{bo} at which drag is minimal. In a trainer the difference between V_{bo} and V_{nv} is quite appreciable, especially when flying at low altitude with gear and flaps up.

During descent at shallow glide angles, with aircraft weight 4,100 kg in flight configuration, V_{nv} is around 300 km/h, and V_{bo} is around 270 km/h. But they decrease after gear and flaps are extended, since the required lift value has not changed. Consequently induced drag has remained constant, while

noninduced drag has increased due to an increase in coefficient of noninduced drag C_{xo} . The aerodynamic drag curve will rise higher, while the points corresponding to V_{nv} and V_{bo} will shift in the direction of slower airspeeds (figures 1 and 2 on back cover) [not reproduced].

Thus in landing approach configuration the boundary airspeed between configurations at the specified aircraft weight is 180 km/h, while according to the Pilot's Manual it is 220-210 km/h on approach descent, that is, there is a margin of $\Delta V = 30-40$ km/h. Airspeed margin to stall is 55-65 km/h. A change in aircraft weight (by plus or minus 10 percent, for example) changes the configuration boundary airspeed by plus or minus 5 percent. But this figure is insignificant. Consequently, if the pilot maintains his glide angle, the aircraft firmly holds airspeed at a given throttle position.

It is quite natural that airspeed will decrease if the pilot shallows his glide angle, that is, pulls back on the controls, and airspeed will increase if he steepens his approach (with throttle setting constant).

It is more difficult to master the approach descent with diminishing airspeed, since this increases the press of time. It is felt first due to decreased time on approach descent (58 instead of 65 seconds), and subsequently due to demands on the pilot's attention (he must more frequently monitor airspeed, engine operation, and other flight parameters) and, most important, the very character of the approach descent changes. The pilot is constantly increasing his angle of attack as airspeed drops, due to which the pitch angle changes. While when over the outer compass locator the aircraft's nose points to the runway threshold, as it approaches the runway it increasingly moves away from the aiming point.

It is very important, but also more difficult to maintain a rate of airspeed decrease so as to reach the roundout initiation point at an airspeed of 220-210 km/h. If the aircraft crosses the outer marker either high or low, naturally the glidepath angle will be steeper or shallower. And of course it will be more difficult for the student pilot to select an engine power setting which will maintain the required rate of airspeed decrease. The pilot's attention is more frequently diverted to monitoring engine, airspeed, and altitude.

Frequently on approaching roundout initiation point the student pilot is unable to correct slight deviations, due to which he becomes tenser, and as a result various landing errors occur. Pilot cadet A. Glushko, for example, on his second solo flight, executed his approach descent with excessive airspeed and below proper glidepath. During roundout he ballooned to 6 meters. On instructions from the tower, he firewalled the throttle to initiate a go-around, but he kept the control stick full back, since at the moment of ballooning he was instructed to hold it. As a result the aircraft went into a high angle of attack, lost airspeed, and set down hard.

Advocates of bringing down airspeed on the approach descent are aware of the complexity of mastering this kind of landing approach, but they are of the opinion that it will be easier for pilot cadets to master the landing approach on a combat aircraft. And although, all other things being equal, the dual-

instruction program will increase, and perhaps there will be more washouts early in flight training, pilot cadets will not wash out in the third year.

We shall now see how altitude of outer marker passage affects the quality of an approach and landing. In a certain training subunit, pilots would begin their final approach descent after crossing the outer compass locator at 300 meters, with engine rpm at 85 percent (in no-wind conditions). In this instance an aircraft reduces airspeed to 240-230 km/h by the middle compass locator, crossing the middle marker at 80 meters. Airspeed is established at 220-210 km/h by initiation of roundout. In the roundout phase, which lasts 3-3.5 seconds, the aircraft slows to 200 km/h, and in the float phase airspeed dissipates to airspeed at touchdown (175-180 km/h) within 4 seconds. During this time the aircraft travels approximately 200 meters and touches down in the middle of the landing area.

All phases of the landing are clearly marked with such an approach descent: roundout, float, touchdown at a normal pitch attitude, with ballooning, repeated breaking of contact with the runway, and touchdown at excessive airspeed occurring comparatively rarely.

At the same time, with this approach descent configuration the flight path during roundout bends significantly, which directly affects the quality of determination of aircraft height at end of roundout and manipulation of the controls.

In another subunit the pilots would cross the outer compass locator at a height of 240-250 meters. With this shallower glidepath an aircraft dissipates airspeed more rapidly, and the aircraft crosses the middle compass locator at a height of 50-60 meters. The aircraft approaches roundout initiation at a higher angle of attack, airspeed dissipates more slowly, and the float phase becomes extended. After crossing the middle compass locator a pilot frequently adds power, and the aircraft touches down at excessive airspeed at the far end of the landing area. There are both positive and negative aspects to this. A disadvantage is the fact that one cannot dissipate airspeed, that is, cut power before reaching the runway. The pilot cuts his throttle at the commencement of the float phase, after crossing the runway threshold, which extends the float. Pilots consider an advantage of this technique to be the fact that during float the control stick requires little or no additional rearward movement. And since the float zone increases by a factor of approximately 2-2.5, the student pilot has more time to assess his aircraft's spatial position and correct any errors. However, if the pilot delays control stick movement during float, touchdown practically always occurs at excessive airspeed, which causes more rapid tire wear. Correction of such errors as crossing the middle compass locator too low, approaching the runway threshold at too slow an airspeed, and coming in short on one's approach can be accomplished, from the standpoint of flight safety, by only one method -- a go-around.

The Pilot's Manual states that the approach descent glidepath after turning final shall be aimed at the point of roundout commencement and that accuracy of calculation shall be determined by the direction of the glidepath in relation to the point of commencement of roundout. If figured correctly, the

aircraft should descend toward this point, which is 50-70 meters short of the runway threshold. At this point we must clarify to what point the aircraft is descending: to the roundout initiation point or to the aiming point? During the approach descent the pilot does not see the point of roundout initiation, nor is this necessary. He determines the point of roundout initiation exclusively by height above ground, which is 8-10 meters for a trainer. Calculations indicate that the roundout phase extends 200 meters (Figure 3) [not reproduced]. Roundout ends at a height of 0.75-1 meter at the runway threshold. Thus the roundout initiation point is positioned at a distance of 200 meters from the threshold, while the aiming point is located 50-70 meters short of the threshold (Figure 3 on back cover) [not reproduced].

Consequently the aircraft is descending not into the point of initiation of roundout but into the aiming point (TS), that is, at the point of intersection of the aircraft's glidepath with the ground surface. Quite frankly, upon approaching the outer compass locator it is rather difficult visually to determine the aiming point (50-70 meters short of the threshold). Therefore the pilot places the aircraft's nose roughly under the runway threshold. As he approaches the runway, the area in his field of vision diminishes, objects in his field of view recede to the sides, and only that point toward which the aircraft is settling remains stationary. The pilot (student pilot) adjusts his glidepath as he crosses the middle compass locator. An error in glidepath can be noted visually. It is advisable to place a special marker 50-70 meters from the runway threshold, as is done at some airfields, to make this determination. For all practical purposes it is only after crossing the middle compass locator that the pilot follows the manual's instructions to aim at a point 50-70 meters short of the runway threshold.

The term "predposadochnoye planirovaniye" [approach glide] also remains as a legacy from the time aircraft made the approach descent with throttle on idle. This was entirely justified, since aircraft had a comparatively high lift-to-drag ratio in landing approach configuration and could maintain airspeed at low rpm. Modern trainer aircraft in landing approach configuration make their final approach descent with throttle advanced, maintaining 80-92 percent rpm, depending on glidepath (shallow or steep) and headwind. With the engine developing considerable thrust, the term "predposadochnoye snizheniye" [approach descent] is more accurate than "planirovaniye" [glide].

The Pilot's Manual states that the turn onto final shall be completed at a height of not less than 250 meters agl; the point at which this turn ends relative to the checkpoint (outer compass locator) is not indicated. Nor does the Manual specify aircraft height on crossing the outer compass locator when making a landing approach from the regular traffic pattern. And yet aircraft altitude when crossing this checkpoint determines in large measure the angle and quality of the glidepath. For example, the turn from base commences at 350-400 meters and ends at not less than 250 meters; therefore passage could occur at 250, 300, or 350 meters. Of course every experienced pilot executes the turn from base as he sees fit in the specific instance. For pilot cadets in the early phases of flight training, however, there should be specified a range of heights above ground level at which to cross the outer compass locator -- 300-250 meters, and the turn from base should be completed 1.5-2 kilometers short of the outer compass locator. This will enable the student

pilot to adjust his final approach parameters. It is also advisable to specify middle compass locator passage altitude. This in our opinion will also improve the quality of the approach and landing. I should like to learn the opinion on this score of flight personnel training student pilots.

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CHERISHING AVIATION TRADITIONS PROMOTES SAFE FLYING

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 9, Sep 85 (signed to press 2 Aug 85) pp 30-31

[Article, published under the heading "Flying and Psychology," by Military Pilot 1st Class Col Yu. Kislyakov and Doctor of Medical Sciences Professor Col Med Serv V. Ponomarenko: "Romance of the Flying Profession"; concluding part, see Nos 7, 8]

[Text] 3. Aviation Traditions and Professionalism

The aircraft taxied to the ramp. Lt V. Semin opened the canopy and leisurely climbed down the ladder onto the concrete. Today he had flown his first solo flight in an aircraft about which he had heard so much at school and about which he had dreamed. It is a great feeling to be controlling such a powerful piece of hardware, even when the very thought that you have been entrusted to fly it sometimes takes your very breath away.

"Congratulations, Comrade Semin! I wish you success in fully mastering the aircraft. Keep up the good work!" The regimental commander shook the young pilot's hand and presented him with a certificate commemorating the occasion.

The lieutenant was congratulated by command personnel, friends and colleagues. And this really made him feel good. Indeed, such a day is special for a pilot. There would be many difficult flights in the future, but he would not forget this one. And what a fine tradition the unit has -- right out on the ramp, immediately after landing, to offer congratulations to a pilot upon completing his first solo flight. A person retains for a long time to come a warm feeling of gratitude toward all those who taught and prepared him.

In our military aviation there are many fine traditions which instill love and affection for flying labor and which bolster aviators' fighting spirit. They continue to develop and grow from one generation to the next, and their patriotic content is being continuously enriched. Aviators attest to the fact that it is much nicer to serve and work wherever established traditions and military rituals are strictly observed, where constant attention is devoted to strengthening traditions.

Flying occupies a leading position in the professional training of flight personnel. And this is understandable, because only in an aircraft, in the air does the pilot apply his knowledge and acquire skills in flying, navigation, and combat. The process of gaining knowledge proceeds in a rigorous sequence, from the simple to the complex. And there is enormous significance contained in this: the new always bears a powerful cognitive charge. And when interest is present, there is no room for complacency and, consequently, violation of flying discipline.

Firm, traditionally fraternal relations between flight and ground technical personnel formed in those now distant years. A constant, relentless striving toward knowledge, improvement of aircraft and expanding of their flying and combat capabilities united people, making the aircraft collective a genuinely innovative, productive and healthy organism. It was precisely an indestructible friendship, a unity of views and aspirations, and a concentration of efforts on absolute accomplishment of assigned tasks which made it possible successfully to defeat the hated invaders during the years of the Great Patriotic War. Our air warriors always remembered how much hard labor was required to make their aircraft combat ready, while ground personnel could see with their own eyes the savage truth of the war skies. And this merely heightened the mutual gratitude and respect, mutual demandingness on knowledge, quality of preparation and operation of aircraft, and strengthened discipline and responsibility for one's deeds and actions.

The homeland highly praised the heroic deeds of its intrepid sons and daughters. Just during the war years alone 2,420 aviators were awarded the title Hero of the Soviet Union, 65 were twice awarded this title, and two were awarded it three times. But even in peacetime there is always room for displaying the finest human and professional qualities. The entire world is familiar with the famed names of the pioneer explorers of space -- Soviet winged heroes, and many of our aviators have been awarded coveted government decorations for mastering new aircraft and for rendering internationalist help to the people of Afghanistan.

But how strong is the bond between the spiritual sources of aviation and its traditions, the flying profession and discipline? Observations, statistics, and comments by flight personnel indicate that this bond can weaken. What is the problem? Aviation has become a mass activity, and the aircraft is no longer a means of self-expression of the human spirit. Perhaps it is not your conventional means of transportation, but nevertheless it is a mode of transportation, with all the demands imposed on it by a public service system and safety regulations. This deliberately caricatured view of aviation is in some measure beginning to penetrate into the public consciousness. As a result its spiritual and intellectual prestige is becoming a secondary factor.

Yes, the profession of aviator has become commonplace. But a pilot cannot be an ordinary, "run-of-the-mill" professional, since constant readiness and preparedness for the most difficult moral test is demanded of him: he must act for the good of others when his life is genuinely in peril. For these others this will be a heroic deed, while for him it is a moral duty, and herein lies the essence of his character. But since the moral element has not and will not become extinguished, gross errors and mishap-threatening situations which

occur demand a differentiated assessment of the direct culpability of the pilot and increased attention to the moral and ethical aspect of things.

Practical experience in looking for the causes of accidents indicates that nobody wants to be blamed, and therefore there sometimes occurs a departure from truthful and noble conduct on the part of those involved. And yet ensuring flight safety is a system grounded on man's conscience, our ethics and duty.

This means that in order to ensure flight safety a profound understanding of the significance of the flying profession and the civic essence of its principles should be in an integral bond with absolute candor and the frank truth about all circumstances preceding an accident.

Where does the building upon traditions and adding to the spiritual sources of aviation begin? The answer is simple at first glance -- in the military line aviation unit. We feel, however, that it begins earlier -- at school. It may seem strange at first glance, but learning to fly an airplane is not the most difficult task at school. It is more difficult to lay down the foundations of the pilot-citizen, aviation patriot, selfless defender of the socialist homeland and internationalist. We are talking about enriching the consciousness of a young man with the ideas of Marxism-Leninism, knowledge of the laws of materialist dialectics, instilling love for the profession, showing him his own creative and flying abilities, and convincing him that one must always give thought to the ultimate consequences of arrogance and carelessness toward equipment and the air. The pilot cadet should become firmly aware that service school is simultaneously a school and a life experience, which must be lived in a worthy manner. Figuratively speaking, long reins are needed to reveal one's person, talent, and abilities. And safety procedures are no hindrance here. Of course it is possible that some things should be revised and reorganized. But this is a matter for flight education science and military administration.

After the first dual flights with an instructor, when a young man has opened up and his heart has become filled with an enraptured sense of the sky, freedom and space, constraints also begin to form. There is "I want" and "I can," but there also are flying rules and regulations, and there is society, which determines what it needs today. Gradually the desires of the individual become permeated with duty to society. The most important thing in this moral reshaping is to ensure that the pilot cadet is not "broken" and does not lose his purpose and direction toward flying. The craving to fly should be psychologically refracted through a sincere attitude toward one's instructor, aircraft technician, mechanic, toward all those who put one in the air. The young aviator should learn to be concerned about others. Under the blazing sun at a distant training airfield, he should want first to quench the thirst of his crew and aircraft, and only then his own thirst. Willpower is developed here, precision in one's thoughts and movements, with the arousing of respect toward others and toward one's equipment, while the joy of experiencing flight makes the burdens of military life the normal routine of service.

Those who inculcate moral and ethical principles in future pilots are faced with many difficulties. Unquestionably the romance of aviation, history, books, films, combat glory rooms, the stories told by veterans, teachers and instructors are all very fine. At the same time there exists orderly military routine, rule of discipline, the barracks, while beyond the gate there is dancing, discotheques, and the opportunities of youth. And not every young man is capable of becoming accustomed to and absorbed in the military environment. It is here that instilling purpose and direction can transform the required discipline into self-discipline. At school a young man is given an education, and his feelings are also educated. He is not yet familiar with all the finer points of flight safety, but he gradually climbs up the steps to an awareness of the fact that the entire regimentation of his life: his daily off-duty routine, training, and procedure laid down by regulations -- is a foundation for advancing to flying skill and the development of the individual.

Today efforts are frequently made to take stress away from the cadet with self-relaxation techniques, tranquilizer pills, soothing colors and music, and other modern devices. But stress can be relaxed... by dreaming about tomorrow's flight. It is very important to teach people to rest in the air. No, not rest the body; rest the soul. This by no means signifies that when in the air one can totally relax and lose one's professional vigilance. With all the physical stresses of a day of flight training, the most unpleasant thing is when flight operations are terminated prematurely, and grounding has always been the harshest punishment for a pilot. This is possible, however, in a collective with a healthy psychological climate, but under no circumstances in a collective in which a young instructor complains about "his boring job." This carries a very great danger -- the danger of alienating a pilot cadet from the meaning and purpose of aviation. A young aviator needs fullness of spirit as the air he breathes.

The flying profession possesses one general trait both for the young and the veteran combat pilot -- that of the spectacle. Especially during landing: everybody watches, notices, comments.... And if somebody does a better job, he frequently begins to put on airs and brag. Egotism and artistic temperament are born in this manner, and this is a bad thing. The profession cannot be stripped of the element of the spectacle, but one can use in training both the example of correct and incorrect actions. It is very important in the psychological-pedagogic process to regulate the public attitude, the affairs of the aviation collective, and to instill respect for traditions. From the very first days of training a pilot cadet is taught that candor in one's relations and judgments, mutual assistance and the endeavor to help a comrade at all times and in all things are integral character traits of the Soviet aviator.

Of course youth lacks experience in the requisite professionalism, but young people have a passionate desire to fly. It is precisely here that strict purposefulness of instruction is necessary, instilling of the need for knowledge, to assimilate intellectual and technical knowledgeability, without which one cannot become an individual. In our opinion, however, at aviation military higher educational institutions little attention is devoted to the history of Soviet aviation -- this important source of professional

inspiration. Unfortunately there are no more specialized secondary schools, and few flying clubs. And yet experience indicates that precisely at such facilities the process of career aptitude determination was much more accurate and sure than with the presently existing system of psychological tests, which provide the capability only of statistically determining the presence of general abilities and provide no information on the test subject as an individual. The young man who came to the service school from the flying club or specialized secondary school was capable of flight training and psychologically ready to "drink deeply the life-giving liquid" from the above-noted spiritual sources. And victories by Soviet pilots on the battlefronts of the Great Patriotic War are proof of this. In addition, the majority of our fine battle veterans who survived during the war years had experienced the schooling of the flying clubs, where they had been infused with a powerful charge of the romance of aviation and inexhaustible love for the homeland and for flying. A psychological tendency toward strengthening the principles, customs and traditions of aviation should heighten public interest in aviation. It is important to ensure that the romance "does not drown in a sea of ink" and that love for the profession "does not bog down" in a pile of legal papers, since this by no means guarantees safety, but merely takes up a great deal of precious time; it is important that the school graduate highly-educated officers who have attained the moral and ethical level of a professional whose name is Pilot. In connection with this our spiritual sources must be reawakened precisely at the military pilot school.

Thus discipline, knowledge, conscientiousness, and respect for the experience of aviation are indoctrinated in the pilot through a system of relationships within the collective and, what is particularly important, through appreciation of his labor. The point is by no means praise or even reward. To appreciate labor means to understand the motive behind a deed or action, an aviator's spiritual need to carry out his professional duty. It is dangerous to ignore traditions, because if one loses respect for history and the experience of the older generations, acquired at the price of selfless labor, it is easy to lose respect for those around and for oneself as well. And this is fertile soil for the sprouting and growth of indifference and lack of principles, conceit and arrogance, which are incompatible with the morality of the socialist society and the Soviet aviation collective.

Our party focuses us on eradication of these alien phenomena, on the struggle for an honest and pure countenance of Soviet citizen. Today the main direction of this important indoctrinational work is productive and innovative labor, a unity of word and deed, initiative and responsibility, demandingness on oneself and one's comrades. This particularly applies to aviation, since it cannot safely exist without a high degree of ethics, without honesty and friendship, without open truth and genuine professionalism. And aviation professionalism is first and foremost the conscience of the entire collective, self-expression through solving problems for the sake of life, truth, and justice. At the same time it also implies trust and frank discussion.

Objective verification has become a firm part of aviation life. But it has not yet become for everybody that which it should become for the true professional -- self-testing, which guarantees both safety and increased skill. But this demands total frankness and goodwill. Otherwise distrust,

resistance and excessive simplification are inevitable, diminishing not merely skills but, what is even worse, weakening the essential strength of aviation.

Equipment has always been dependable in reliable hands. This means that it is capable of "surprises" in the absence of knowledge and skill. Equipment is highly diversified. But are not training skills and methods, as well as man's physiological capabilities, also highly diversified? These are all questions pertaining to our ethics and morality, which all are obliged to preserve. In addition to the great many well-known ways, the problem of flight safety should be resolved by reawakening spiritual sources, including with the aid of the romance of aviation.

There are plenty of practical examples of aviation to cause one to think deeply and realize that a way to prevent violations of flight safety regulations is to be found in the history of our aviation, its function, and in man's conscience. Our fathers and grandfathers -- knights of the "fifth ocean" -- always counted on their successors building upon aviation traditions, enriching history with new distinguished accomplishments, loving and respecting their profession. And one must state that romantic enthusiasm and affection for one's job do not leave a genuine aviator right to the very end of his days. Take the following true story. Recently we had a brief conversation with former squadron commander S. Kolpyshev, who had been grounded for reasons of health. Thirty years had passed since his grounding. This veteran replied as follows to a question about how he felt during inclement weather and whether he missed flying: "Well, not too much. One thing concerns me on a day when the weather is bad -- what is the ceiling today?!"

That inexhaustible state of inspiration, that sincere and tender love of flying, which genuine aviation patriots retain to the end of their days, consists precisely in this. Regardless of all else, we must preserve the spiritual foundation of our famed Soviet aviation.

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THE REGIMENTAL COMMANDER IN FLIGHT-GROUNDING WEATHER

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[Article, published under the heading "Military Educational Institution Affairs," by Maj N. Burbyga: "In Nonflying Weather"]

[Text] Through his sleep he heard the drumming of heavy raindrops. He woke up thinking about the weather. Getting out of bed, by habit he walked over to the window and realized that it was not rain. How could it be raindrops? The window was being heavily pelted by grainy bits of freshly-fallen snow. Once again the weather was grounding them. "Something's wrong in that office in the sky," Naydenov thought to himself unhappily. "It is right now that we should be devoting a lot of time to training instructor pilots, and the weather...."

For some reason he suddenly remembered a conversation with the senior commander when he was appointed to this job.

"Don't forget, Aleksandr Stepanovich," the general told him, "that you have been entrusted with a special regiment -- a training unit. Do you know the saying? It's one thing to sing a song and quite another thing to compose it. In your regiment people will not be simply flying but will be learning to fly. And it is also very important that your subordinates have faith in you, their commander. Then your efforts will be ten times as effective."

As he was traveling to his new duty assignment, it seemed that he was ready for anything. He had thought through and considered everything, but after he reported to his new assignment he saw that it was simply impossible to prepare for everything, for every new job opens up different horizons for a person and illuminates new problems, particularly a job like this one.

Commanding officer of an aviation training regiment.... A great deal lies hidden behind these words. A regiment is not simply a military collective, it is also a garrison, with all its written and unwritten rules and problems. Everything is too closely interwoven here -- combat readiness, job duties, daily living routine, leisure time. The general had been right a thousand times over when he stated that without reliable assistants, without active, innovative, purposeful work by the party organization, daily cares and

concerns will inevitably overwhelm a commander, foul up and confuse all plans and schedules.

And Naydenov was certainly pleased to have around him people who were not only knowledgeable and experienced but enthusiastic as well. Take, for example, his chief of staff, Lt Col I. Pomazan. They had a good businesslike relationship. They understood one another perfectly, and not because they had known each other since both were cadets at the Kharkov Higher Military Aviation School for Pilots imeni Twice Hero of the Soviet Union S. I. Gritsevets. It was simply that Lieutenant Colonel Pomazan was a person who made sure that every order and instruction was carried out promptly and all documents were properly drawn up and prepared. He was able to judge Pomazan's performance in comparison with that of his predecessor -- an experienced officer but without initiative, slow, accustomed to working with a cautious eye toward his superiors. Time and again the commanding officer had tried to draw his former chief of staff into a frank conversation, to arouse interest on his part! But he had been unsuccessful. When they parted company, a slightly bitter taste was left in his mouth. Somebody had said at the time: "They just didn't get along." This was not true. It is precisely straightforwardness and frankness which Naydenov appreciates in his new chief of staff. Some persons perhaps would not be willing to harm relations with the regimental commander at a critical moment, but this chief of staff never hides behind other people's backs and is not afraid to speak his mind.

Once he said to the commanding officer: "Things are really getting tough, Aleksandr Stepanovich. But we must maintain continuity."

The regimental deputy commander for political affairs, Lt Col A. Perminov, and party committee secretary Lt Col S. Ivanchenko are a match for the chief of staff. Could the commanding officer get along without their support, attention, and committed, keen involvement? Of course not. Neither previously, when he was just assuming his duties with this regiment, nor now, when he has even more concerns to address. On many occasions they must tackle a problem together or simply enlist one another's support. For example, the matter of improving the personal flying and tactical proficiency of instructor personnel became an item of first priority. Naydenov gathered together his deputies and raised this urgent matter. And although he had long since been nurturing a certain idea, examining it from all aspects, he did not present it immediately. First he heard the others out. They discussed the matter in detail. Finally the chief of staff asked: "Well, comrades, have we not advanced to the point of trying a combined tactical air exercise? Isn't this the solution?"

That was it, his idea! But it was not unhappiness he felt at that moment, not annoyance from the fact that it had issued from somebody else's lips, but on the contrary, relief, for it is important for a commander to see that he has not merely comrades alongside him but persons of like mind.

"Makes sense," the deputy commander for political affairs spoke up in support of the chief of staff. "But we must consider the matter from all aspects. And we must endeavor to make sure that this proposal does not become a

'scenario' imposed from above. It is essential that our people, each and every one of them, become enthusiastic over the idea."

"So we shall focus the men toward a combined tactical air exercise," Aleksandr Stepanovich stated in conclusion. "Plus," he paused briefly, "from two airfields simultaneously, in order to eliminate any departures from reality."

...Naydenov glanced at his watch. There was still time -- he had woken up early. But this weather.... He was scheduled to go up today with Lt N. Protsenko. His thoughts again took off. Naydenov recalled that now distant summer morning. The weather had also grounded flight operations that day. He was doing paperwork, but he could barely keep down a feeling of irritation. But when he heard a knock on the door of his office, and a dejected Cadet Protsenko appeared in the ample doorway, all the accumulated irritation disappeared. He thought to himself: Is he really incorrigible? He certainly was guilty of a disciplinary infraction, but expulsion would be an extreme measure. After all, the lad possessed that main, key thing (it was not because of the handsome uniform that he had twice applied for admission), around which a person's character forms, thanks to which yesterday's schoolboy becomes a pretty fair pilot. A dream. A bright, beckoning boy's dream of the sky, which right here and now, in this office, in spite of all else, not only imparted a kinship and closeness between them, but also inspired faith that not all was lost.

"I don't intend to preach a sermon," the commanding officer told the cadet. "I don't have time for that. I'll lay it on the line. If you make a real effort to take yourself in hand, I am willing to help. I give you my solemn promise, although it will not be easy to accomplish. Otherwise -- we shall be parting company. But in order for you not to be expelled from the school, I as your regimental commander must pledge my word. If you understand what I am telling you, go out into the hall and think about it for 10 minutes. If you can do it without letting me down, come back to my office, otherwise -- dismissed."

The cadet left the office, and Naydenov, while waiting, went back to work. The thought came to him that he had probably been excessively severe and impersonal with the cadet. But why excessively? He had acted like a father.... Ten minutes passed, 15, and the cadet did not return. Would he really not be back? When he had come to the conclusion that the cadet would not be back, there was a knock on the door....

...The blizzard continued unabated. Out on the street the wind drove swirls of snow into Naydenov's face, howled, spun wildly. All things indicated that there would be no flying that day. This meant they would have to use the alternate schedule, which had also been prepared yesterday. He had marked down the school as the second agenda item, following the issuing of the day's instructions. Why had he listed it second rather than sixth or seventh? Simply because he considered this to be an important item. The community school was small and crowded, but it was attended by his men's children. Now they had just built a new school, and it was his most important concern as commanding officer.

Climbing into the little UAZ, Naydenov caught the familiar aroma of sunflower seeds, a smell he had known since childhood. He looked around. There they were, in a neat little bag, between the seats.

"Where did these come from?" he asked in surprise, scooping out a handful of warm, buttery-plump seeds, evidently quite recently out of the oven.

The driver was embarrassed: "It was Kiseleva, comrade colonel. She forced them on me.... Honest, you can't imagine."

But he could imagine. Kiseleva, a kindly, gray-haired old lady, did not know how to thank her representative for helping her -- moving her from her decrepit old dwelling. So she had brought a gift.

The vehicle turned onto the community's main street, and braked to a halt -- little boys were filing across the street hand in hand. Their teachers were taking them to a new plaza which had been laid out in the community on some vacant land.

Naydenov's attention had been drawn to that vacant plot of ground from his very first day in the regiment. But in a somewhat distant manner, as if in passing. Once several months later, walking home from work in the evening as was his custom, he first became aware of the thought that he would very much like to see the community become different -- attractive and pleasant. He shared his thoughts with his deputies. Together they gave thought to the matter, and drew up a plan, which some at first thought was unrealistic fantasy. But why was this? The plan prescribed only the most essential things -- a children's playground, a little plaza to spend one's leisure, and a new school. They discussed the plan at the party committee. After the meeting one of the members could not suppress a smile and an ironic comment: Well, we've had a nice little planning session. Naydenov pretended not to have heard the comment. There was not point in arguing. You convince through deeds.

...School principal Galina Yefimovna Gavrilova was happy to see him.

"Aleksandr Stepanovich, you are a most welcome guest. As you see, we are about finished with the move. We are very grateful to you!" Dropping her voice to a whisper, she asked: "Is it true that you are being promoted and transferred?"

He calmed her with the assurances that this was nothing but rumor and that he had no plans to transfer elsewhere....

Returning to the airfield, Naydenov went into his office. The telephone immediately rang.

"Comrade commander," it was his chief of staff. "The weather forecasters are giving us the go-ahead!"

"So we shall be flying after all."

Hanging up the receiver, Naydenov thought about Lieutenant Protsenko: "We'll see what kind of a pilot he has become."

Rising from his desk, he lingered a moment. It was pleasant in the office. A nice desk, telephones right at hand, a radio receiver.... But a regimental commander is not in his office too much of the time, even in flight-grounding weather. This is understandable, since the windows of his office look out onto the runway. That is where the important things are happening.

The sky was gradually becoming lighter. Naydenov noted that the weather reconnaissance aircraft had taxied out onto the snow-cleared runway. This sight got him moving. Now every minute counted.

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A & P TECHNICIAN HAS DRINKING, DISCIPLINE PROBLEM

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[Article, published under the heading "Topics of Ethics," by Col V. Vladimirov: "Protect Your Good Name"]

[Text] A guardedness could be sensed in his words. The officer seemed reluctant to talk about the beginning of his service in the military and his initial successes at military aviation technical school. But I remembered him as a cadet. The cadet company commander had many nice things to say about him at the time. And suddenly such a change. But perhaps it was not so sudden?

After graduating from service school, Viktor Atroshin liked everything about the fighter regiment: the precise rhythm of inspection and maintenance procedures, the chief of his technical maintenance unit group, who was sparing with praise, and the attentiveness of the experienced veteran technicians, who were willing to give assistance at all times.

The years passed swiftly in continuous concern and effort to ensure high-quality, prompt and timely fighter servicing and maintenance, to increase his specialized knowledge and reinforce his professional skills. Viktor matured, passed the examination for a highly-proficient specialist rating, and gained good friends in the regiment. He was particularly close to group senior technician Sr Lt Aleksandr Gerasimenko.

Things became busier as time passed. New aircraft began to be delivered to the unit. Viktor Nikolayevich, as his fellow soldiers had begun calling him, continued to work and study assiduously. He would always finish a job once begun. Year by year his socialist pledges pertaining to mastering aircraft equipment became more and more ambitious. And every time at the end of the training year he would successfully confirm his first-class rating.

Because of the pressing nature of his work assignments, he was staying late in the regimental technical maintenance unit hangar with increasing frequency, but nobody at home complained to him about this. His wife knew the cost and value of the military word "must." She was pleased with his successes and assiduous work efforts. He was not particularly fond of talking about his

achievements. If they were discussed, it was only when he had earned a commendation.

For some time his wife had been aware of signs of irritation and dissatisfaction with his fate cropping up in such conversations. She did not know that Viktor had committed a breach of regulations, for which he had to answer not only to the technical maintenance unit chief but also to the regimental brass. Although Senior Lieutenant Atroshin had a good reputation in the outfit, nevertheless he had to be meted punishment.

Here is what had happened. A fighter had been delivered to the technical maintenance unit, requiring immediate inspection and maintenance. It was a busy time. Intensive flight operations were in progress, and it was important to keep every aircraft flying. Viktor Atroshin, as senior airframe and powerplant technician, was instructed to perform maintenance adjustments on the landing gear and, assisted by mechanics, to wash, clean and ready the landing gear for inspection.

"Everything will be completed on schedule," Atroshin assured the group chief and went to work.

As the job was nearing an end, Senior Lieutenant Gerasimenko walked up to Viktor: "Listen, there's this motorcycle I'm planning to buy. It's got to be checked out. Let's the two of us go. The workday is over anyway...."

Atroshin should have declined to accompany him, explaining that he could not leave the technical maintenance unit while the squadron was waiting to get the fighter back. But he did not want to disappoint his friend. Hesitating for an instant, he consented to go along, leaving the washing of the landing gear "for later."

By the following morning they knew about Viktor's action both in the technical maintenance unit and in the squadron. The delay in readying the aircraft through his fault upset his fellow soldiers. If they only had known that Gerasimenko and Atroshin had ended the motorcycle inspection by hoisting a few! Viktor told the truth to the regimental commander.

"I cannot forgive what has happened. You will be punished," the colonel told him.

...Atroshin and I were sitting in the airframe and powerplant maintenance group room. There was still a guarded look in his eyes. On a table lay the training class record log and group specialist personnel socialist pledges performance board. The following notation was written in one of the columns next to Atroshin's name: "Take specialist 1st class tests."

I held my gaze on this line, waiting for Atroshin to comment. He remained silent for quite some time, and then proceeded to explain. Yes, he had made such a pledge at the beginning of the training year, just as he had made several years ago, when he bore the proficiency rating emblem with the number 2.

"It seems I can't get away from the 2nd-class rating, or else it does not want to part company with me. But it is high time to earn the master rating."

"What's the problem?"

"I don't want to think about it.... I decided: that's the way it has been, let it remain that way," he replied tonelessly, his eyes downcast.

"You seem to be marking time."

"I don't know. My comrades tell me to stop the drinking, and I myself am fed up with being drunk every evening." He fell silent, pursuing his own thoughts, perhaps returning to his reflections. He then stated with determination: "Soon I'll get back to normal. I shall boost my proficiency rating. I will tell you about the incident, although it is very painful for me."

And Sr Lt V. Atroshin related the following story.

On that day, receiving a work assignment from his group chief to inspect an aircraft's fuel system, Atroshin slowly and deliberately inspected the various components and connections, and made sure that the external tanks were in good working order. Waiting for the group chief to return from headquarters, he made one more walk-around inspection of the fighter, stroking with his rough palm the sun-warmed duralumin elevator skin. He sank into thought, recalling how he had come into aviation.

...Viktor had liked airplanes from childhood. As a schoolboy he had been active in the model airplane club at the Pioneer Palace and had designed and built a radio-controlled model of a MiG. He had then studied at secondary technical school, military aviation technical school and, finally, service in a line unit.

He knew aircraft well. And this initially had turned his head. Perhaps it was for this reason that his attitude toward his fellow students had been one of barely-concealed haughtiness. This was not particularly obvious, but when the occasion called for it he would always utter his favorite: "Just what have they taught you at military higher school?" Some harbored resentment against him for this, but many forgave him, considering his experience and diligence. His self-esteem was also fueled by the fact that he had received several commendations in just a year's time....

The group chief came over and, determining after an inspection that the technician had done the job well, praised him: "Attaboy, Viktor Nikolayevich. Now go out to the 2nd Squadron flight line. The competition for the title of best airframe and powerplant specialist is being conducted there. Don't forget to take your maintenance procedures checklist."

"I am never without it," lied Atroshin, who had not used the checklist for quite some time. He counted on his memory and experience. He felt reassured by the knowledge that the regimental technical maintenance unit chief, a knowledgeable aviation engineer, was on the panel of judges.

As he headed out for the ramp, the senior lieutenant thought to himself with regret: why did he have to tell a lie? The group chief was not indifferent to the honor of the subunit. He would be in a state of nervous anticipation until the results were announced.

As the competition was in full swing, the regimental deputy commander for aviation engineer service appeared on the ramp. He proceeded to ask questions, each one more difficult than the preceding one. Atroshin had to talk about the design and layout as well as procedure of inspection and adjustment of powerplant assemblies. In his haste he omitted an important operation.

"What does the maintenance procedures checklist say?" the senior officer asked. "Read it, comrade senior lieutenant."

Atroshin became confused, and then admitted that he did not have it with him. The outcome of the competition was settled. The nod was given to another officer, Sr Lt Andrey Turchenko.

At this point Atroshin should have accepted the decision of the panel of judges, but his pride was injured. After competition ended he called Turchenko aside and said to him in a soft voice, so that nobody would overhear: "Well, Andrey, officially you are the champion. But unofficially, how about continuing with the competition?"

"What do you mean?" Turchenko asked in surprise. "As far as I can see, it's settled."

"Yes, but not quite. In a combat environment there will be no time to read over the maintenance procedures checklist. There will be no time! One must know everything from memory. Do you see the two-seater over on the technical maintenance unit ramp? Let's have a little contest with it."

"You're kidding!" Turchenko exclaimed, concern in his voice. "That aircraft is from our squadron. We shall be getting it back tomorrow. What if something happens?"

"Scared, huh?" Atroshin interrupted him. "I guess you can't handle it. No point in continuing the conversation."

"All right," retorted Andrey, angered. "Too bad we can't gather an audience, but I'll show you a thing or two anyway.... We'll meet after supper."

That evening Atroshin and Turchenko went over to the technical maintenance unit. Maintenance personnel were still at work in the hanger. Endeavoring to get a number of jobs started for continuation the following day, they had stayed late. All were busy at their own tasks, and nobody paid attention to the technicians who had appeared at the two-seater.

"Let's not waste time," said Atroshin, climbing up the ladder. "Note down the time. I am going to inspect the instruments and cockpit engine controls. As

I do so, I shall explain the sequence and procedure of inspection, and you compare my answers with the checklist. Then we'll change places. We'll see who makes the fewest mistakes."

But they did not change places. The regimental technical maintenance unit chief proceeded over toward the aircraft. The officers panicked. Atroshin hastily climbed down from the cockpit, in his confusion failing to notice that he had accidentally switched on the auxiliary fuel tank jettison circuit....

They did not see each other again until the next morning, just before formation. Viktor reeked of alcohol.

"Where did you manage to tie one on?" Turchenko asked.

"Last night, after our aborted contest, I went visiting. I also celebrated my defeat. Is it obvious? I hope it'll pass," replied Atroshin, a challenging note in his voice.

After formation the technical maintenance unit chief summoned him to his office and sternly informed him: "I have learned about your yesterday's doings from others. But why didn't you have the guts to inform us? If this had happened in a combat situation...."

"Sorry, sir," Atroshin said, breathing in deeply.

The technical maintenance unit chief stood by his window in thought for a few moments, and then firmly stated: "False pride and weak will have been your undoing, Comrade Atroshin. Aviation does not like dishonest people. The command authorities have decided temporarily to suspend you from your duties. We shall also review the matter of your proficiency rating."

"That is how I became a specialist 2nd class," Atroshin concluded his confession. "The commanding officer of course was right. And I shall endeavor to atone for my guilt. I have just decided to submit an efficiency innovation proposal. It should stand me in good stead...."

His gaze softened, and his eyes flashed with sparks of excitement.

"You know, our work station for servicing shock absorbers could be better. There is a pressure gauge, filter and reduction gear on a single hose. Every time, in the course of performing service procedures, you have to look for the special truck for pumping nitrogen into the system. In one's haste one can drop the equipment. If that happens, you can kiss the pressure gauge goodbye. And it is also difficult to keep equipment clean in such a process sequence. My innovation will speed up the performance of maintenance procedures and improve their quality. This has yet to be accomplished, but I will definitely do it," the senior lieutenant firmly assured me.

Yes, this is a thing of the future. In the meantime, the airframe and powerplant maintenance group chief and the other technical maintenance unit officers are faced with a difficult question: does Atroshin have enough strength of will to become once again a conscientious maintenance specialist,

who once received such warm words of praise from his superiors and comrades? Does he still have in his heart that which should draw him close to aviation and bind him with invisible threads to the busy job of group senior technician?

Sr Lt V. Atroshin blames nobody for his predicament. He firmly intends to shape up. A great deal depends on Atroshin himself. Will he strengthen the threads which bind him to aviation, or will he break them asunder once and for all by another rash and thoughtless act?

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AIRBORNE MEALS ON LONG FLIGHTS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 9, Sep 85 (signed to press 2 Aug 85) pp 38-39

[Article, published under the heading "Constant Attention to Flight Safety," by Col Med Serv V. Potkin: "On Long Flights"]

[Text] What does medical science recommend regarding taking food and water on long flights? Of what do airborne rations consist? How should meals be correctly organized for aircrews on extended flights? Officers A. Azanov, V. Cherepanov, and others have requested that this matter be discussed.

On long flights aircrews are subjected to considerable nervous and emotional stress as well as considerable physical work loads. According to figures in Soviet and foreign studies, a pilot's energy expenditures when flying a modern aircraft range from 110 to 120 cal/h, with water loss ranging 100-250 ml/h. This affects the subjective physical well-being of aircrews, and consequently flight safety as well. A person's readily-available energy reserves average 300-400 grams of glycogen -- the organism's principal reserve carbohydrate. With intensive conversion to glucose, it can last only 20 minutes or even less. This is why prompt replenishment of the organism's energy stores, which are formed in the process of complex conversions of principal food substances, primarily sugars and amino acids, is a fundamental physiological and health factor which affects the maintaining of aircrew work fitness.

Replacement of water lost by the organism on long flights involves the peculiarity that the sensation of thirst is somewhat delayed, appearing after the loss of approximately 1 liter of liquid. This amount of water loss has a negative effect on an aviator's fitness, work efficiency, and flying proficiency.

The medical recommendations pertaining to food and water intake on long flights are as follows: the organism should take in food and water at a rate of 130-220 cal of energy and 100-250 ml of liquid per hour of flight to replenish losses. While it is recommended that food be taken every 4-5 hours, water should be taken in hourly, in addition to water consumed during meals, without waiting to feel thirsty.

Food consumed on a long flight should conform to the energy and fluid requirements listed above, should be tasty, should be ready for consumption without additional processing, should be easily assimilated by the organism, should not cause intestinal gas, and should be as small in size and light in weight as possible. In addition to tea or coffee, boiled water in special containers should be carried on board an aircraft.

Airborne rations meet these requirements and, as practical experience indicates, provide for a aircrew food and water requirements during flights of various duration. Airborne rations are subdivided by specific designation into meals to be consumed on extended flights at atmospheric pressure in a pressurized cockpit to 405 mm Hg (altitudes to 5,000 m) and meals to be consumed at atmospheric pressure below this value (altitudes above 5,000 m). Aircrews can take food during flight (preserved and other ready-to-eat meal items) and water by moving aside the oxygen mask or raising the pressurized helmet face-piece (with continuous oxygen flow). When cabin pressure is less than 405 mm Hg, it is hazardous to displace the oxygen mask and raise the pressurized helmet face-piece due to the possibility of development of hypoxia. A special oxygen mask with a valve and mouthpieces are provided for such flights, for taking food and water through the mask valve, with pureed foods in squeeze tubes.

A high-altitude meal consists of a first and second pureed course, fruit or berry juice, and coffee with milk or tea. The first course might be cabbage soup, borscht, or kharcho soup, while the main course might be meat or liver pate, poultry puree, or cottage cheese with fruits or berries. To replace water losses, in addition to the liquid contained in pureed foods, the high-altitude meal includes various juices -- black currant, apricot, plum or prune, apple, grape-apple, and cherry, as well as beverages such as coffee with milk, cocoa with milk, and tea with apple, cherry, and other juices. Its nutrient value is somewhat less than an airborne meal taken with oxygen mask pushed aside and averages 830 calories, with 34.0 grams of protein, 41.2 grams of fats, and 77.0 grams of carbohydrates.

In connection with the fact that airborne meals consist primarily of preserved foods, during the preflight meal in the aircrew mess hall, crew members must take the Hexavit multivitamin complex. Airborne meals are available in a variety of combinations, in order to ensure adequate and varied nutrition for aircrews on long flights (see table on following page).

It is recommended that a high-altitude meal incorporate a variety of foods. In addition, two clear plastic or wax-impregnated cardboard mouthpieces (one for food, the other for water) and two paper napkins are provided with each meal variation. Airborne meals are packed in polyethylene and are handed to that crew member responsible for meal distribution immediately prior to takeoff. Coffee and tea are prepared in the mess hall and are carried aboard in thermos bottles. Fruit and berry extract is mixed into the tea. For a nonstop flight lasting up to 24 hours, a Hexavit multivitamin pill is added to the airborne rations, with two pills for flights lasting more than 24 hours.

The onboard meal variations are in conformity with recommended energy and fluid content and are issued on the basis of one onboard meal per crew member

with a flight lasting 4 hours or more. Meal variety 1 is issued for a flight lasting 4-5 hours, two variety 1 meals for a flight lasting 4-8 hours, two variety 1 meals and one variety 2 meal for flights lasting 8-12 hours, two variety 1 meals, one variety 2 and one variety 3 meal for flights lasting 12-16 hours, two variety 1 meals and one each of variety 2, 3, and 4 for flights lasting 16-20 hours, and two variety 1 meals and one each of variety 2, 3, 4, and 5 meals for flights lasting 20-24 hours.

(1)	Наименование продуктов	Кол-во (в граммах) на один прием (2)				
		Варианты бортовых пайков (3)				
		1	2	3	4	5
(4)	Хлеб пшеничный из муки первого сорта	100	100	100	50	100
(5)	Печенье или галеты из муки пшеничной первого и высшего сортов	30	30	30	30	30
(6)	Консервы мясные разные	100	200	100	100	100
(7)	Сахар-рафинад дорожный	15	15	30	15	30
(8)	Карамель леденцовая	—	20	—	20	20
(9)	Шоколад	15	—	—	15	—
(10)	Соки натуральные плодовые и ягодные	250—280	140	250—280	250—280	250—280
(11)	Чай	1	1	1	—	—
(12)	Кофе растворимый натуральный	—	—	—	2,5	2,5
(13)	Экстракт фруктовый или ягодный	2	2	2	—	—

Key: 1. Food item; 2. Quantity (in grams) per meal; 3. Airborne meal variations; 4. Wheat bread of grade A flour; 5. Biscuit or hardtack of grade A and AA wheat flower; 6. Various preserved meat products; 7. Traveler's refined sugar; 8. Caramel candy; 9. Chocolate; 10. Natural fruit and berry juices; 11. Tea; 12. Instant real coffee; 13. Fruit or berry extract

Meals on long flights are consumed on a 4-meals-per-day basis. Airborne meals are consumed on a normal flight personnel meal schedule, that is, the first airborne meal is consumed 4 hours after the preflight meal in the aircrew mess hall, with subsequent meals consumed every 4 hours following the first airborne meal. Each crew member is issued one airborne meal for nonstop flights lasting 4-5 hours. An aircrew is not removed from the aircrew mess list, that is, an airborne meal is issued in addition to the current aircrew meal standard. As stated above, two airborne meals are consumed during flights lasting from 4 to 8 hours. In these cases and in the case of flights of longer duration, flight personnel are removed from the mess list for those meals coinciding in time with the flight. Issued airborne meals are recorded on the meal vouchers of aircrew members. Upon completion of a mission, aircrew personnel are placed on the list to take regular meals in the mess hall as specified by the unit daily routine. Food is issued thereby in strict conformity with the specified food allotment for the meal in question, and not later than 4 hours after the aircraft lands.

When a long nonstop flight is cancelled or postponed 24 hours or more, as well as when an aircraft returns from a flight ahead of schedule, airborne rations shall be turned in to the aviation technical unit mess hall. In this case

crew members are provided meals through the mess hall in the prescribed manner.

The current organization of round-the-clock meals on long flights is in conformity with the recommended dietary schedule, is in conformity with physiological requirements, and provides compensation for energy expenditures and water losses and, consequently, ensures proper operation of the aircraft.

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ADULATORY REMINISCENCES ABOUT COSMONAUT TITOV

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 9, Sep 85 (signed to press 2 Aug 85) pp 40-42

[Article, published under the heading "Readers Request," authors listed after each section: "Cosmonaut-2"]

[Text] The editors receive a great many letters addressed to German Stepanovich Titov. Readers write to send him holiday greetings and inquire about what he is doing these days. Efficiency innovators and inventors frequently turn to him with requests for assistance. Cosmonaut-2 is invited by workers, kolkhoz farmers, soldiers, college students, schoolchildren, and people active in literature and the arts to visit them. The readers will find answers to some of their questions in the following selection of materials.

1960.

24-year-old Lieutenant Titov was one of the first candidates for enrollment in the corps of future cosmonauts. In addition to excellent results on tests to determine physical and psychological strength and endurance, he was distinguished by quickness and originality of thinking, excellent memory response, breadth of interests, and an intense curiosity about and interest in all new things, about which he always endeavored to acquire a thorough understanding. Titov also won people over with his straightforwardness, to which considerations of selfish advantage were alien, and a highly-developed sense of duty. This young officer's keen response to everything taking place around him indicated that specialists at the Cosmonaut Training Center would not be bored with this student.

And this is the way things proved to be. As a rule he did excellently in those classes, training and testing sessions which were clear to him, for which he was frequently cited as an example to the other trainees. Things were different in those instances when Titov was in any way not in agreement with the training schedule and curriculum, when he had his own view of an item in question. It is true that he usually accepted convincing explanations immediately. Thanks to diligent effort and superior ability, Titov soon

became one of the top men in the cosmonaut corps (top 6) and was assigned to preflight training on the Vostok orbital craft.

The character traits of this outstanding individual were particularly vividly revealed during preparation for and execution of his 24-hour orbital mission. After Yuriy Gagarin's mission, a flight lasting 25 hours seemed to be so bold that at first none of the specialists at the Cosmonaut Training Center dared throw their support behind the author of the proposal -- Academician Sergey Pavlovich Korolev. A mission running up to 3 orbits seemed more realistic. At this point German Titov spoke out resolutely. During a discussion he stated: "I understand why a 24-hour mission is necessary, and in my opinion a 24-hour mission can be accomplished right now. And just so nobody will accuse me of making impossible claims, I volunteer to fly the mission myself."

In addition to excellent execution of the entire 24-hour mission program of activities, in which he tested for the first time the effectiveness of manual orbital vehicle attitude control, at the request of the specialists German Stepanovich devoted considerable attention to monitoring his own actions in a state of weightlessness. After the mission he told of fairly specific physical discomfort, which a cosmonaut experiences during the first days of a mission. The information obtained from Cosmonaut Titov made it possible substantially to add to and improve the cosmonaut training process.

Candidate of Medical Sciences Ye.
Karpov, first head of the Cosmonaut
Training Center imeni Yu. A. Gagarin

* * *

1961.

This was one of the first debriefings, between Cosmonaut Training Center specialists and the person who had flown the first 24-hour manned orbital mission.

Maj German Titov talked enthusiastically about his impressions and subjective sensations during the flight and answered questions. Discussing G-loads during the launch into orbit and his first impressions of weightlessness, the cosmonaut stressed that on the third and fourth revolutions (roughly between 5 and 6 hours after launch) he experienced some physical discomfort: slight nausea, a fullness in the stomach, similar to sensations following an extended session on the swing and, most important, the sensation that his body was in an inverted position. His head seemed to be flung backward, with his legs and feet up. Subsequently scientists called this phenomenon the illusion of inverted position. This sensation stayed with him during practically the entire flight. The degree of these manifestations, however, was not reflected on those operations prescribed by the mission activities schedule.

"German Stepanovich. Did you not feel dizziness when the position of your head changed?" asked otolaryngologist Doctor of Medical Sciences I. Bryanov.

"No! The main thing was the sensation of inverted position of the head (thrown back), but there were no other subjective manifestations. Of course I had the desire to make abrupt movements with my head and provoke a vestibular reaction, but my attempts to do this did not lead to the desired result."

"Did the nausea affect your appetite during the mission?"

"Here's the deal. I was supposed to try a dinner meal selection for space flights, for before me nobody had eaten a meal in space. But preliminary data obtained during preparations for the mission put up a caution flag. There was concern that bread crumbs or bits of other food might enter the respiratory passages during inhalation. During the flight, however, I enjoyed sorrel soup with miniature loaves of bread, prune plums and pureed meat in tubes, and I failed to note any difference in taste from terrestrial viands. The dessert of black currant juice in a squeeze tube tasted like sheer nectar."

"German Stepanovich," physician A. Antoshchenko addressed the cosmonaut, "how do you rate the vital activities support system -- water supply, waste disposal, articles of personal hygiene?"

"I had no problem using the support systems...."

This unique press conference -- a debriefing interview between the doctors and German Titov on the first days after the mission -- took place in a businesslike and at the same time unaffected, easy manner.

The very fact of such an interview, especially today, 24 years after the events, cannot be considered unusual. But at that time completion of a 24-hour mission was a big deal. Everything which was investigated and learned in flight was important and absorbed by us as real discoveries. Everything was examined through the prism of prospects for accomplishing the main task of the first phase of space exploration -- determination of the possibility of man to live and function in space.

There is no need to state that this interview also provided food for thought regarding future manned missions (preparations for such missions were already in progress!), key medical experiments during space flight, and those adjustments in the cosmonaut training program which were dictated by the conditions and results of the 24-hour mission flown by cosmonaut-2, German Stepanovich Titov.

This was only one of the first steps on the long journey up the ladder of space exploration.

A. Lebedev, Honored Physician RSFSR

* * *

1969.

Pilots were gathered in the pilot briefing room waiting for flight operations to commence. They included Cosmonaut-2 German Stepanovich Titov. He did not

stand out among the crowd -- an ordinary pilot, for whom flying is his life, with a respectful attitude toward everything connected with flying in one way or another. He listened carefully to the weather briefing and reports on the condition of the runway and radio communications. He himself asked questions, discussed things, and refined certain details.

This is the way things were at a preflight briefing which was memorable to me. It was conducted just as in any line aviation unit. The commanding officer is a former ground-attack pilot, a Hero of the Soviet Union, and a test pilot with considerable experience. His assistants are also a good match -- experienced, aggressive, knowledgeable officers.

Our time was drawing closer. I did not note any nervousness in Titov. But some of us, including me, were quite excited: after all, Cosmonaut-2 would be flying front-seater! German and I strode out to the aircraft. I climbed into the cockpit, secured the ejection seat straps, and closed the canopy.

The aircraft shot forward with relentless, violent swiftness and lifted off the runway with a deafening roar. I was pushed heavily into my seat with a thud, and the sky approached from all sides.

A chandelle, a loop, a roll, followed by another loop. Clouds, sky -- everything spun. My notion of the firmness of up and down grew hazy. The G-loads pushed me into the seat, alternating with weightlessness. Titov put the aircraft "over the top," flying in a parabolic trajectory. I was in a state of soaring lightness. My muscles relaxed, my body soared; if it had not been for the straps, I could have hung in the air without support.

G-loads, weightlessness, swift change of attitude relative to the ground -- and all this was not the main activity but rather the background, the environment in which the fighter pilot performs the main task for the sake of which he flies -- the mission of detecting and destroying a target. He must observe the readings of a great many instruments and displays, operate weapons, search for and attack the target. All this as an aggregate constitutes the fighter pilot's job.

It is unlikely that there exists another profession which demands of a person so much composure, self-mastery, willpower, instantaneous reaction, and the ability to assess the situation literally within fractions of a second and make a correct decision, the only right decision in the given conditions, as is demanded by the flying profession.

You could see the ground through breaks in the cloud cover and, looking through at it, you sensed the speed of flight. A chandelle, a climb. The aircraft smoothly transitioned from one attitude to another. One sensed an experienced hand. No theory can take the place of practical experience -- you can't learn to swim without water. Any practice session on the simulator will be effective only if it is concluded with an actual flight.

...Our fighter was climbing straight upward. The altimeter needle was completing a full swing. But we were still far from the full-throttle ceiling. The aircraft turned cockpit down and seemed to hang suspended for a

time. I had the impression that the engine was about to stall. Titov had made a throttle adjustment. A slow roll, another, followed by another loop.

Cosmonaut-2 flew with confidence and precision. His experience was evident. He has had a great many flameouts -- 3 air starts during a single flight! Once, when he was flying at an altitude of 20 kilometers, he suddenly had a flameout. There was a solid undercast, with a thick layer of clouds extending from 1,500 to 10,000 meters. The fighter descended almost 16,000 meters with engine out. But the pilot took his time -- he was confident of the equipment, and he was right. On his first attempt to air-start, at an altitude of 9,000 meters, the engine fired up.

Titov flies with joy and enthusiasm, and this work captivates him entirely.

"This is the best possible kind of practice for pilot-cosmonauts," German Stepanovich once said. "For them flying is not merely desirable but absolutely essential. Flying supplements the specialized cosmonaut training and helps them remain continuously fit, both physically and psychologically."

Col O. Nazarov

* * *

1979.

Today is Saturday, 17 November. In 7 minutes the Red Star will be pulling away from the platform at Moscow's Leningrad Station. "It's almost midnight," I said to myself, "but German has not yet arrived." Suddenly a familiar figure appeared. German Stepanovich, wearing an elegant brown raincoat and hatless, as always when in "civvies," approached the car with quick stride.

"Is that Titov?" the female car attendant asked me in a hushed voice.

I nodded silently.

We were on our way to Leningrad as members of a Soviet delegation at talks with representatives of the United States, Canada, and France on matters pertaining to deploying an experimental satellite system to determine the location of ships and aircraft in distress. Statistics indicated that while more than 280 large vessels went down each year, the numbers were even higher for small vessels and craft.

The first meeting was convened on 19 November in one of the conference rooms at the Hotel Pribaltiyskaya. When Yu. Zurabov, head of the Soviet delegation, uttered German Stepanovich's last name as he was presenting the delegation members, there was loud applause. In this manner the foreign specialists paid respectful tribute to Cosmonaut-2 who, in spite of his busy schedule, was taking active part in development of the international satellite system.

The talks in Leningrad took place in an atmosphere of mutual understanding and productive cooperation. The heads of the foreign delegations -- D. Calio (USA), Ch. Bleviss (Canada), and G. Brachet (France) -- expressed their

satisfaction at the progress achieved in the joint efforts. A Memorandum of Understanding was signed, defining the goals and forms of cooperation, as well as the obligations and responsibility of the various parties. In addition, the representatives of the various countries discussed and reached agreement on technical parameters on compatibility of designs which had been determined previously at meetings in Paris and Ottawa.

The KOSPAS-SARSAT joint project implementation plan was also examined, and matters pertaining to possible participation by other countries and international organizations in this project were discussed.

The experimental stage, the purpose of which was to demonstrate and evaluate the possibilities of the system (and this was understood by all parties to the talks) would be preceded by years of determined work effort on designing and building highly complex satellite and ground equipment, establishment of system centers, devising and detailing their interaction, development of computer center software, etc. As early as this session, however, SARSAT representatives announced that the launch of the first NOAA series satellite equipped with a search and rescue system was scheduled for April 1982, while the Soviet representatives agreed to launch their own first satellite 4-7 months after the announcement of readiness to launch the U.S. satellite.

Things actually worked out differently: the Soviet Union was the first to launch a satellite, in June 1982 (Kosmos 1383), and to begin flight testing of the KOSPAS-SARSAT system on a joint program. The U.S. NOAA-E satellite, carrying SARSAT gear, was finally launched in March 1983. That same month the USSR launched this system's second satellite (Kosmos 1447).

But all this happened later. Heated debates were taking place in Leningrad at that time, and complicated technical questions pertaining to design compatibility were being resolved. In the corridors, where the discussion of issues continued, German Stepanovich was always surrounded by experts. They were interested not only in Titov's opinion of the project as a pilot but also in his biography, his activities in the cosmonaut corps, and details of his orbital mission. And as always, German Stepanovich answered all questions with light banter.

He spoke with particular warmth about Leningrad, a city with which he had first become acquainted in 1957, as a young pilot, and which subsequently, as he put it, had opened up to him more and more new pages of its heroic history.

As I learned, German Stepanovich has many friends in Leningrad -- the shipbuilders at the Zhdanovskiy shipyards, writers and artists. I recall his get-together with USSR People's Artist sculptor Mikhail Konstantinovich Anikushin, author of the monument to A. S. Pushkin in Leningrad and the Memorial to the Heroic Defenders of Leningrad. They had plenty to talk about: Pushkin is Titov's favorite poet, and the regiment in which German Stepanovich served had reliably guarded the Lifeline -- the Ladoga Route -- night and day during the blockade of Leningrad.

Self-restraint and dignity, modesty and charm, unpretentiousness in dealing with others -- these character traits of German Stepanovich won over all those

whom he met on those days: foreign and Soviet experts, Leningrad workers, and management at the Hotel Pribaltiyskaya.

...22 November 1979. The platform of the Moscow Station in Leningrad. 10 minutes to departure of the Red Arrow. We entered the car, and the female car attendant, smiling, asked me in a hushed voice: "Is that Titov?"

I nodded affirmatively....

V. Sirotin

* * *

1985.

I had the good fortune to meet Yuriy Alekseyevich Gagarin on several occasions, but for a long time fate did not bring me together with Cosmonaut-2. It is true that I had strolled along Prospekt Titova in Donetsk, I had visited the sovkhos named after him in Derzhavinskiy Rayon, in the Virgin Lands, I had seen him on television, and I had read his books and articles. But I actually met him in a quite unexpected way.

It was on New Year's Eve 6 years ago. I had gone over to the Hotel Moskva, where a friend of mine from Donetsk was staying. He was not alone in his room -- a person of modest stature in civilian dress, slightly graying at the temples, rose from an armchair and introduced himself with a laconic: "Titov."

From the very outset I was charmed by his manner: lively, witty, attentive toward his conversation partner. During numerous subsequent get-togethers I never saw him in a bad mood or downcast, although his hard work and position of great responsibility probably gave him many occasions for such a mood. I also noted that Titov was an excellent raconteur. He had just returned from Vietnam, which he had visited as a representative of the board of the Soviet-Vietnam Friendship Society. He related in a lively manner his impressions about the people and the new developments in their lives.

The subject later turned to poetry. German Stepanovich began talking about Pushkin, reciting many lines by the poet. I have never been able to get him to say whether he himself has ever written any poetry. He fends off such questions with light banter....

His love of Pushkin, multiplied by thorough knowledge of his poetry, formed the basis for the poem "Graying":

We always live focused toward tomorrow,
The past rarely evokes sorrow....
One of the very first cosmonauts
Recites Pushkin to us from memory.
I gaze at him, enthralled --
This is no general here in the prime of his years.
I see before me major's shoulder boards
And that almost boyish portrait,

Which, hastily enlarged from a newspaper picture,
I carried, rejoicing: "Here he is! He's back!"
It seems to have been just yesterday,
But the cosmonaut has turned quite gray.

At the time Titov had not yet reached his 45th birthday. Once in a conversation with him I conjectured about his graying, to which he commented: "It is from being nervous and concerned over others."

I thought to myself: being nervous and concerned over others more strongly than about oneself is the highest manifestation of humanity. In fact, kindness toward others and a willingness to help even practically a total stranger is an integral quality of Titov.

During one of our get-togethers I read to him a poem by my friend Anatoliy Shcherbakov dedicated to the Vostok 2 mission and published in 1962. German Stepanovich liked the poem. I then suggested that he read the manuscript of a new book by this poet -- "Baykonur, XX vek" [Baykonur, 20th Century]. Titov consented. I figured that it would take him quite some time to read through this rather voluminous manuscript. But he called me up several days later: "Why don't you drop over?"

Titov not only had read the manuscript and jotted down a number of delicately-phrased comments ("Perhaps it would be better this way...", "You might consider making a change here...."), but also had written a brief statement about his impressions of the book. This commentary appeared as an introduction to A. Shcherbakov's volume.

And this is not an isolated instance of its kind. The cosmonaut wrote for LITERATURNAYA GAZETA comments on the poems of Nikolay Dorizo and a review of Mark Gallay's book "S chelovekom na bortu" [Manned Mission].... And he did all this not because of any formal contractual arrangements or instructions, but obeying the behest of his heart.

Although he is always extremely busy, German Stepanovich tries to keep up with the country's cultural life. Last year, receiving a short leave, every evening for 10 days he attended new plays at Moscow theaters.

He does not need to be talked into public speaking. He just needs to find the time. On the eve of the 50th anniversary of Yu. A. Gagarin's birth, a Moscow library named after the first cosmonaut had its formal opening. German Stepanovich, giving advance warning that he would not be able to be present at the beginning of the ceremony, dropped by the library for half an hour. He listened to remarks by others, spoke himself, and left -- for an interview with journalists....

Vigorous energy and fine sensibility, innate intelligence, profound knowledge in many fields of science, the ability to make friends and to be loyal to friendship -- these and many other qualities of German Stepanovich Titov compel me to turn in my mind again and again, with respect and gratitude, to those persons standing at the headwaters of the Soviet space program, who 24

years ago made a choice: to entrust the second manned space mission to German Titov.

He lived up to this trust then, and he is constantly living up to it -- by his very life.

O. Belikov, member of the buro of the
Commission on Space Literature of the
RSFSR Union of Writers, recipient of
the N. Ostrovskiy Prize

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APPLICATIONS OF MICROCOMPUTERS DISCUSSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 9, Sep 85 (signed to press 2 Aug 85) pp 42-43

[Article, published under the heading "The Contemporary Era and Scientific and Technological Advance," by N. Konkov: "What Can a Microprocessor Do?"]

[Text] "Paramount attention should be devoted to improving machine tool engineering and speeding the development of computer hardware, instrument engineering, electrical equipment engineering and electronics as catalysts of scientific and technological advance."

From address by CPSU Central Committee General Secretary Comrade M. S. Gorbachev at the April (1985) Plenum of the CPSU Central Committee

In the Computer Technology exhibition hall at the Exhibit of Achievements of the USSR National Economy there is a permanent exhibit entitled "Microprocessor Applications in the Economy." It acquaints visitors with the amazing world of computers, in which we shall be living in the not too distant future.

"Why don't you join the group which is about to be taken through by senior methods specialist Natalya Nikolayevna Tokareva?" exhibition hall director B. Koryshev suggested to me.

Just inside the entrance one's attention is drawn by a sweeping wall painting depicting an orbital space station. These and other such displays indicate the realms of application of microprocessors -- from household electronic goods to highly complex satellites and spacecraft. One could say that microelectronics developed in large measure in response to the fact that the evolving space program urgently needed small, reliable, and economical devices.

And what about aviation? The conditions of modern-day air-to-air combat demand that a fighter be able, in the most complex environment, to proceed to the target and destroy it. But this requires sophisticated navigation and aiming gear. The onboard computer is the heart of the aircraft's control and

navigation system. It processes signals received from various sensors and, on the basis of programs entered into the computer in advance, produces control commands, which are applied to the flight director instrument needles or to the automatic pilot.

Here is another example. An automated air traffic control system (AS UVD) can monitor conformity between aircraft flight paths and the required routing configurations, adjust flight schedules as time progresses, and warn an ATC controller if aircraft deviate excessively from assigned altitudes and headings. Electronics makes it possible to build an automated ATC system which can simultaneously monitor hundreds of aircraft in an area of half a million square kilometers. A microwave instrument landing system will provide capability to land aircraft virtually fully automatically.

Electronic computers have found application in the most diversified areas of science, technology, and the economy. Microprocessor devices have helped implement in a practical manner the long-standing idea of incorporating mechanical workers -- robots -- into production, creating shops with flexible production linkages.

Microelectronics makes it possible to build computers with unprecedented capabilities, which are becoming increasingly more available. In time, for example, there will be keyboardless voice-operated typewriters. No less enticing are traffic control systems which will help the driver select a route and keep him informed on highway traffic jams as they develop.

"Thanks to microelectronics," relates Natalya Nikolayevna, "computers can 'see,' 'hear,' and 'talk.' In the not too distant future 'communication' with computers may approach the level of human communication."

The computer is a most important catalyst of scientific and technological advance. Their diversity is enormous: from microprocessors small enough to fit inside wristwatches to multiprocessor computer systems capable of performing hundreds of millions of operations per second! Essentially an electronic computer is a data processing system, a control system, or a general-purpose monitoring system.

The first electronic computers were enormous installations. The requirements of aircraft and space hardware prescribed a general trend toward decrease in size, weight, power requirements, and increased reliability. This served as a stimulus to develop integrated circuits.

Circuits are called integrated (or, to use a Russian word, obyedinennymi) because a single microchip contains thousands of electronic components of various function, too small to be seen by the naked eye. They are formed by applying a predetermined distribution of impurities and interconnecting with extremely fine conductor paths applied to the surface of a crystal of ultrapure silicon. Integrated circuits consist of patterns masked onto substrates, where the substrates themselves are enclosed within the body of the chip. They are subdivided, by complexity of design, into IS [SSI] -- integrated circuits [small-scale integration] (containing dozens of components), SIS [MSI] -- medium [medium-scale integration] (thousands of

components), BIS [LSI] -- large [large-scale integration] (tens of thousands of components), and SBIS [VLSI] -- ultralarge [very large scale integration] (hundreds of thousands of components).

Improvement in the technology of manufacturing microelectronic devices is one of the factors of present-day scientific and technological advance. It is the development of the LSI circuit which brought to modern electronics the "micro" device. Computers became microcomputers. The main device in a computer -- the processor (where most operations take place) -- is now called a microprocessor.

"You see before you the series K581 microprocessor package," announced Tokareva. "It is designed for microcomputers and complex controllers, as well as digital automatic control equipment."

Her pointer had halted next to some little metal boxes slightly smaller than a matchbox and an array of sewing needles attached to a metal frame. That was the entire package!

"What is that diagram?" one of the visitors asked, pointing to a panel a full square meter in size.

"That is what is contained in the microprocessor case, but enlarged 3,000 times."

The group proceeded to the next section of the exhibit -- "Designing Microprocessor Systems." I listened to the guide's presentation, but I kept asking myself: "How is it possible to place on a single chip a great many components of various function, tens of thousands of electronic components invisible to the naked eye?"

"The technology of manufacturing integrated circuits," the methods specialist explained, "boils down to the sequential forming of thin layers, or films, under rigorously specified conditions, and the preparation of topological diagrams with the aid of microlithography. The designing of integrated circuits has been automated to a maximum degree. Only with the aid of the computer is it possible to design a structure containing thousands of components, place them in the desired area, and run interconnecting paths between them."

An interesting discussion took place by the "Interactive Computer Systems" display. Our attention was drawn by the Elektronika Tz-29MK personal computer system.

"Thanks to electronics," explained Natalya Nikolayevna, "the specialist is able not only to work faster but to think faster as well. A new branch of knowledge is being born literally before our very eyes -- automation of scientific research processes."

Indeed, any research is always a certain logical or mathematical chain: having received an answer, the specialist asks the next question. And each time he is faced with new problems. This means that intensification of the creative

process is connected first and foremost with accelerating the pace of dialogue and the process of obtaining an answer. Here too personal computers -- small electronic computers easily accommodated on a desktop -- have proven to be extremely helpful.

What are their advantages? They employ disk mass storage media. Any information, including algorithms and programs, can be stored on disks, which look like flexible LP records. In addition, such computers are provided with a display, which displays information in the form of numbers, color diagrams, graphs, and drawings. Another advantage is their relatively low cost.

These personal computers can be used as adding machines, as well as to learn programming skills. A computer can easily be linked by telephone to a computer network, giving access to diversified information and the most powerful mainframes. And this is very important for the scientist or engineer working on some theoretical problem. Personal computers are ushering in a new age in management of the economy, in science, and even in people's daily lives.

A large section of the exhibit is titled "Employment of Microprocessors in the Economy." I shall mention only one of the numerous displays -- the BAKSI airborne automated system. It is a component of a multipurpose flying laboratory carried on board an Il-18 aircraft, designed for meteorological, experimental, and applied research connected with the program of study of earth resources and environmental quality monitoring.

What do microprocessors give to the nation's economy? They provide electric power savings of 15 percent, make it possible to increase by almost 50 percent the railcar turnaround factor, make it possible to increase labor productivity from 3- to 5-fold, and to achieve a 30 percent savings in fuels and lubricants. The figures are impressive.

This is the contribution engineers, designers, and scientists have made toward a successful sendoff for the new five-year plan and toward preparations to greet the 27th CPSU Congress in a worthy manner.

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TITOV BELITTLES U.S. SPACE PROGRAM, CONDEMNS SDI

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[Article, published under the heading "Contemporary Issues," by Hero of the Soviet Union Lt Gen Avn G. Titov, Pilot-Cosmonaut USSR: "Two Worlds, Two Policies"]

[Text] Today's space program involves thousands of space vehicles streaking across the expanses of the universe; it is a vast potential which encompasses the latest advances in various fields of science and technology, and it is people working on the cutting edge of scientific and technological advance. Less than three decades have passed since the Soviet Union launched the world's first artificial earth satellite, and yet the space program has taken a firm place in our lives, having become a branch of the nation's economy. The range of its investigations and practical utilization is unusually broad: communications, television, meteorology, navigation, environmental protection, investigation of earth resources.... They encompass to one degree or another the interests of people of literally all professions. And what a boundless laboratory opened up for scientists with man's entry into space! Unfortunately, however, not all research in space is being conducted in a desirable direction.

Recently I have been asked the following questions at get-togethers with readers: "How could it happen that the space program has become part of the Pentagon's strategic planning?", "Did you military pilots in the first group of cosmonauts imagine that space technology would be used for military purposes?" Readers of the journal AVIATSIYA I KOSMONAVTIKA also ask such questions in their letters to the editors.

Today, when space technology is frequently presented as some kind of miracle by the Western mass media, it is not particularly difficult for the U.S. Government to arouse the world with the idea of "Star Wars," to present it as a realistic, well-conceived plan to combat means of delivering nuclear weapons. Rank-and-file Americans believe that from a satellite one can practically make out a soldier's rank insignia or eavesdrop on the telephone conversation between two generals traveling in their cars. And those who entertain doubts about this are given assurances that, although this picture is slightly at odds with reality, this is only a temporary situation and that

soon these things will come to pass. This naive attitude is being instilled in the taxpayers for good reason. The American people are impressed by being first and by prestige. The present administration in the White House decided to make use precisely of this, pushing through to please the military-industrial complex the so-called "Strategic Defense Initiative," seeking to justify it with the notorious "Soviet military threat."

It is frequently written in the West that the true plans of our space program are concealed, that the Soviet space program has been used for military purposes practically from the very first artificial earth satellite. Twenty-five years have passed since the first group of cosmonauts was formed. It is hardly likely that anything could be concealed over this span of time. And to those who still entertain any doubts I say in all candor and seriousness that none of us entertained the slightest thought of using a spacecraft for military purposes. We were filled with enthusiasm and resolve to overcome more modest difficulties than those which the times have advanced before us today.

K. E. Tsiolkovskiy, our teacher in space exploration and utilization, wrote: "I never work on improving ways of waging war; this is contrary to my spirit. In working on rocket devices, I pursued peaceful, lofty goals: to conquer the universe for the benefit of mankind...." These thoughts as expressed by our great fellow countryman are near and dear to all Soviet cosmonauts. In 1961, when I rode into orbit, I realized and perceived how small and vulnerable our blue planet is, and I realized how wise Tsiolkovskiy had been in his views.

As far back as the mid-1950's U.S. politicians, military experts and scientists were giving considerable thought to the goals the space program should serve. The Americans were the first to announce their intention to launch a satellite, and they were very surprised when this feat was accomplished by the Soviet Union. At that time many people in Washington believed that the Soviet success was purely of a political, prestige significance. But when a second satellite, with a dog on board, was launched into orbit on 3 November, the Americans were forced to acknowledge our scientific accomplishments. Their national pride had been injured. And resounding statements to the effect that the USSR was possibly gaining a military advantage took down a peg or two the Pentagon leaders, who were planning a preventive nuclear war against our country.

The United States commenced a feverish pursuit of the front runner. Thirty-five spacecraft launches worldwide occurred from October 1957 through September 1959 (when the first man-made Soviet vehicle landed on the Moon). Nineteen of these launches failed, and all 19 were U.S. launches. Five of the 35 were Soviet launches, and all were successful. On 15 May 1960 the Soviet Union boosted a fourth satellite into orbit. Its size and weight indicated that our country was surely and certainly picking up the pace in the exploration of space and that manned space flight was not far off.

It is interesting to note that in that same month of May the U.S. intelligence service was put in an awkward position before the entire world -- it was caught red-handed. A U-2 reconnaissance aircraft, flown by U.S. military pilot Francis Gary Powers, was shot down over Soviet soil. This incident

served to give added impetus to the U.S. program to develop photoreconnaissance satellites. Discovery, and subsequently Samos laid down the foundations of spy-in-the-sky systems.

What was the Soviet Union doing at that time? Where was it directing its efforts in space? The world community received answers to these questions literally within 11 months. On 12 April 1961 the Vostok spacecraft carried the first human into space. That same day words filled with humanism rang out from Moscow to the entire world: "We consider the victories in conquering space not only achievements of our people but of all mankind as well.... We place our achievements and discoveries not in the service of war but in the service of peace and the security of peoples. The advance of science and technology opens up endless possibilities for conquering the forces of nature and utilizing them for the benefit of man, and peace must be secured first and foremost toward this end." Nor was this the first such declaration.

Back on 15 March 1958 the Soviet Government made a proposal to ban the use of space for military purposes and called for international cooperation in the area of space exploration. Soviet successes engendered in the United States the fear that the Soviet Union, being in a front-runner position, might also be leading in the military utilization of space. This circumstance made it possible fairly rapidly to conclude a number of treaties on space. These included the Moscow Nuclear Test-Ban Treaty, prohibiting nuclear testing in the atmosphere, space, and underwater, the Treaty on the Principles of Activities of Nations Pertaining to Exploration and Use of Space, including the Moon and other celestial bodies, and the Agreement on rescue of cosmonauts and return of cosmonauts and objects launched into space.

Many people felt that space exploration, which was off to such a rapid start in the 1950's, was a boundless area of activity. Therefore initial plans of space exploration proliferated. Communications, navigation, weather and geodetic satellites appeared one after the other, as well as Earth resources satellites. Unmanned probes were dispatched to the Moon and other planets of the solar system. The first space-vehicle exploration missions produced encouraging results. A second, qualitative stage began in the development of space hardware. The principal directions of employment of space vehicles were also defined. At the same time it had become obvious that space programs are very costly, and further exploration of the universe would require joint efforts.

The beginning of the 1970's was marked by a thaw in relations between the USSR and the United States. A number of agreements were concluded on developing joint space programs. Later Pentagon spokesmen claimed that the Soviet Union had taken advantage of detente to surge ahead in its arms program. As is frequently the case, however, they leveled this accusation at us only in order to conceal their own aims. Precisely at that time, when the world was witness to fruitful Soviet-U.S. cooperation, the Pentagon began developing space weapons. General J. Morgan, a top U.S. Air Force official, made an admission in 1976 which today sheds light on the policy of the current White House administration. "The space program," he stated, "was once criticized as a luxury which the nation cannot afford. In the coming decade it will become one of the most reliable cards our country has ever played to ensure its long-

term defense." This was not a prediction being made by a seer. Morgan was basing his opinions on scientific studies pertaining to the development of space weapons.

Dwight Eisenhower was the first U.S. president to view space as a potential theater of military operations in addition to considerations of politics and prestige. He stated in a special message to Congress on 2 April 1958 that the space program should promote "intensification of space-related studies for military purposes by those organizations directly related to national security." John Kennedy stated it in franker terms: "...Just as in past centuries a nation which controlled the oceans was master of the continents, so today he who controls space will be able to control the Earth."

And then we have that speech of 23 March 1983 which aroused worldwide attention. It even acquired a name -- "Star Wars." Most of the statements made in this speech are grounded on the ambitious "High Frontier" project drafted by the Heritage Foundation research center. On the 175 pages of this document its authors advocate the creation of an "absolutely reliable" shield against ballistic missiles for U.S. territory and that of U.S. allies. On the basis of this document, the present Administration called upon scientists and engineers to create "means of making nuclear weapons systems useless and obsolete."

The Americans perceived this speech variously. Some called it pure fantasy, while others enthusiastically support the "Star Wars" idea. In addition, the White House's futurism is covered with a veil of protection of the population against nuclear arms. In spite of the great variety of opinions, however, most people view the U.S. space venture with apprehension, and this is understandable.

Already today the U.S. armed forces have a special command, which has been given the name Space Command. It has its own staff and engages in entirely real activities: planning the use of space assets in the interests of the Department of Defense. The range of missions performed by satellites is rather extensive. They include ship and submarine navigation, communications for the national political and military command authority, for all branches of the armed forces, photographic, electronic, weather, geodetic, and other kinds of reconnaissance, and strategic missile launch detection. Approximately 75 percent of all U.S. satellites are used for military purposes. Research and development of the ASAT antisatellite system is in full swing, while Pentagon plans call for building and deploying new kinds of offensive weaponry in space.

The present Administration's actions pertaining to the development of offensive space weaponry pursuant to the "Strategic Defense Initiative" appear strange, to put it mildly. It would seem that top U.S. political and military leaders have forgotten about the existence of the 26 May 1972 ABM treaty, Article 5 of which states that the parties to the treaty pledge not to develop, test or deploy sea, air, space, or mobile land-based ABM systems or components. And when the illegality of various actions directed toward militarization of space is pointed out to them, they twist and turn, looking for loopholes to justify their actions in the eyes of the public.

Frequently spokesmen of the present Administration openly and deliberately slander the Soviet Union. This was the case, for example, during the first round of Soviet-U.S. nuclear and space arms talks in Geneva, when the Americans declared the space objects tracking station near Krasnoyarsk to be a missile attack early warning radar system.

The disinclination on the part of top U.S. leaders to consider the objective linkage between offensive and defensive strategic systems and to grasp the logic of nuclear confrontation seems even more bizarre. Establishment of a large-scale ABM system, such as Washington is contemplating, will disrupt the strategic balance, for hopes of warding off a retaliatory strike cannot be viewed other than a buildup of offensive potential.

Just how should our country conduct itself under the circumstances? What kind of response measures can the USSR take? The USSR minister of defense and the chief of the General Staff of the USSR Armed Forces noted in this connection that the Soviet Union has no other option but to take response measures. The nature of these measures will be determined by the Soviet leaders, and they will be adequate to that threat which can be presented to the Soviet Union and its allies. The initiators of "Star Wars" should not forget that "the development of offensive space weapons will inevitably result in diminished security for both the United States and its allies."

We would like the Soviet position at the talks being held in Geneva to be correctly understood by the peoples of the world. We do not seek to gain any unilateral advantages and we have no intentions of threatening anybody. We want to live in peace and to maintain normal relations with other countries. "We propose to the U.S. Government," stated CPSU Central Committee General Secretary Comrade M. S. Gorbachev, "that things be done in such a manner that it is evident to all -- to our peoples and to other countries -- that the policies of the USSR and the United States are directed not toward animosity and confrontation but rather toward the search for mutual understanding and peaceful development."

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